CONSULTATION PAPER: DRAFT REGULATIONS TO IMPLEMENT THE URBAN WASTE WATER TREATMENT DIRECTIVE IN SCOTLAND (WITH GUIDANCE NOTES)

LIST OF CONSULTEES:

Anglers Co-operative Association
Association of Directors & River Inspectors of Scotland
Association of Scottish Chambers of Commerce
Association of Public Analysts of Scotland
Association of Low Strength Scotch Whisky Producers
Association of Scottish District Salmon Fishery Boards
Association of Scottish Shellfish Growers
Atlantic Salmon Trust
Brewers' Association of Scotland
British Agrochemicals Association
British Institute of Agricultural Consultants
British Organic Farmers & Organic Growers Association
British Waterways Board
Central Scotland Water Development Board
Chemical Industries Association
Confederation of British Industry
Convention of Scottish Local Authorities
Crofters Commission
Crop Protection Unit, East of Scotland Agricultural Unit
Ecological Adviser to the Secretary of State for Scotland
Farming, Forestry & Wildlife Advisory Group
Fertiliser Manufacturers Association
Forestry Commission
Friends of the Earth (Scotland)
Highlands & Islands Enterprise
Imperial Chemical Industries
Institute of Terrestrial Ecology
Institute of Water & Environmental Management
Institution of Civil Engineers
Law Society of Scotland
Macaulay Land Use Research Institute
Malt Distillers Association of Scotland
National Farmers' Union of Scotland
National Association of Waste Disposal Contractors
Regional and Islands Council (9 & 3)
River Leven Trust
River Purification Boards (7)
River Tweed Commissioners
Royal Commission on Environmental Pollution
Royal Environmental Health Institute of Scotland
Royal Society for the Protection of Birds
Salmon & Trout Association
Scotch Whisky Association
Scottish Agricultural College
Scottish Anglers National Association
Scottish Association of Directors of Water and Sewerage Services
Scottish Council Development & Industry
Scottish Dairy Trade Federation
Scottish Enterprise
Scottish Landowners' Federation
Scottish Natural Heritage
Scottish River Purification Boards Association

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STATUTORY INSTRUMENTS

1993 No. (S.)

LOCAL GOVERNMENT, SCOTLAND
PUBLIC HEALTH, SCOTLAND

The Urban Waste Water Treatment (Scotland) Regulations 1993

Made	*1993*
Laid before Parliament	*1993*
Coming into force	~~*30th June*~~ *1993*

The Secretary of State, being a Minister designated(a) for the purposes of section 2(2) of the European Communities Act 1972(b) in relation to measures relating to the collection, treatment and discharge of urban waste water, and the treatment and discharge of waste water from certain industrial sectors, in exercise of the powers conferred on him by that section and of all other powers enabling him in that behalf, hereby makes the following Regulations:

(a)S.I. 1992/1711.

(b)1972 c.68.

Citation, commencement and extent

1. These Regulations may be cited as the Urban Waste Water Treatment (Scotland) Regulations 1993, shall come into force on 30th June 1993 and shall extend to Scotland only.

Interpretation

2.— (1) In these Regulations, unless the context otherwise requires–

"agglomeration" means an area where the population and/or economic activities are sufficiently concentrated for urban waste water to be collected and conducted to an urban waste water treatment plant or to a final discharge point;

"coastal waters" means the waters outside the low-water line or the outer limit of an estuary;

"collecting system" means a system of conduits which collects and conducts urban waste water;

"the Directive" means Council Directive 91/271/EEC concerning urban waste water treatment(a) and references to other Community Directives are references to Directives other than Council Directive 91/271/EEC;

"domestic waste water" means waste water from residential settlements and services which originates predominantly from the human metabolism and from household activities;

(a)OJ No. L135, 30.5.91, p.40.

"estuary" means the transitional area at the mouth of a river between fresh-water and coastal waters, the outer (seaward) limits of which are shown on the maps kept in accordance with regulation 11;

"eutrophication" means the enrichment of water by nutrients, especially compounds of nitrogen and/or phosphorus, causing an accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned;

"high natural dispersion area" means waters which the Secretary of State has identified as such under regulation 3;

"industrial waste water" means any waste water which is discharged from premises used for carrying on any trade or industry, other than domestic waste water and run-off rain water;

"local authority" has the same meaning as in the Sewerage (Scotland) Act 1968(a);

"population equivalent" is a measurement of organic biodegradable load, and a population equivalent of 1(1p.e.) is the organic biodegradable load having a five-day biochemical oxygen demand (BOD5) of 60g of oxygen per day, the load being calculated on the basis of the maximum average weekly load entering the treatment plant during the year, excluding unusual situations such as those due to heavy rain;

"river purification authority" means a river purification authority within the meaning of the Rivers (Prevention of Pollution) (Scotland) Act 1951(b);

"sensitive area" means waters which the Secretary of State has identified as such under regulation 3;

(a) 1968 c.47.

(b) 1951 c.64.

"sludge" means residual sludge, whether treated or untreated, from urban waste water treatment plants;

"urban waste water" means domestic waste water or the mixture of domestic waste water with industrial waste water and/or run-off rain water;

and other expressions used in the Directive shall have the same meaning as in the Directive.

(2) Any reference in these Regulations to a numbered regulation or Schedule is a reference to the regulation or Schedule so numbered in these Regulations.

Sensitive areas and high natural dispersion areas

3.— (1) For the purposes of these Regulations, the Secretary of State shall by 31 December 1993 identify sensitive areas, and may by that date identify high natural dispersion areas, in accordance with the criteria set out in Schedule 1.

(2) The Secretary of State shall review the identification of sensitive areas and high natural dispersion areas at intervals of no more than four years.

(3) The Secretary of State shall deposit with each river purification authority maps showing the location and limits of sensitive areas and high natural dispersion areas wholly or partly within its area.

Duty to provide and maintain collecting systems and treatment plants

4.— (1) Subject to paragraph (2) below, every local authority shall ensure that collecting systems which satisfy the requirements of Schedule 2 are provided–

(a) where the urban waste water discharges into receiving waters which are a sensitive area, by 31 December 1998 for every agglomeration with a population equivalent of more than 10,000;

(b) without prejudice to subparagraph (a) above–

(i) by 31 December 2000 for every agglomeration with a population equivalent of more than 15,000; and

(ii) by 31 December 2005 for every agglomeration with a population equivalent of between 2,000 and 15,000.

(2) Paragraph (1) above shall not apply where either–

(a) the river purification authority within whose area the discharges are made has certified that the establishment of a collecting system is not justified because it would produce no environmental benefit; or

(b) the Secretary of State has certified that the establishment of a collecting system is not justified because it would involve excessive cost,

and individual systems or other appropriate systems are provided and the river purification authority has certified that they achieve the same level of environmental protection.

(3) Every local authority shall ensure that urban waste water entering collecting systems is treated before discharge in plants provided in accordance with regulation 5 and that–

(a) plants built in order to comply with that regulation are designed (account being taken of seasonal variations of load), constructed, operated and maintained to ensure sufficient performance under all normal local climatic conditions;

(b) treated waste water and sludge arising from waste water treatment are re-used whenever appropriate; and

(c) disposal routes for treated waste water and sludge minimise the adverse effects on the environment.

Requirements as to treatment plants

5.— (1) Subject to paragraph (5) below, treatment plants which provide secondary treatment or an equivalent treatment shall be provided–

(a) by 31 December 2000 or, in an exceptional case, such later date (not being later than 31 December 2005) as the Commission may agree pursuant to a request under Article 8.1 of the Directive, in respect of all discharges from agglomerations with a population equivalent of more than 15,000;

(b) by 31 December 2005 in respect of all discharges from agglomerations with a population equivalent of between 10,000 and 15,000;

(c) by 31 December 2005 in respect of all discharges to freshwaters and estuaries from agglomerations with a population equivalent of between 2,000 and 10,000.

(2) Subject to paragraph (3) below, treatment plants which provide more stringent treatment than that described in paragraph (1) above shall be provided by 31 December 1998 in respect of all discharges from agglomerations with a population equivalent of more than 10,000 into sensitive areas, or into the relevant catchment areas of sensitive areas where the discharges contribute to the pollution of these areas.

(3) Paragraph (2) above shall not apply in relation to a sensitive area where the river purification authority within whose area the plants are situated has certified that it is satisfied,

as a result of monitoring, that the minimum percentage of reduction of the overall load entering all urban waste water treatment plants in that sensitive area, and all urban waste water treatment plants in the catchment area of that area the discharges from which contribute to the pollution of that area, is at least 75% for total phosphorus and at least 75% for total nitrogen.

(4) Where, following a review of the identification of waters as sensitive areas or high natural dispersion areas under regulation 3, an area ceases to be identified as a high natural dispersion area or becomes identified as a sensitive area, then, as respects that area, paragraph (1) or, as the case may be, paragraph (2) above shall have effect as if the relevant date specified in that paragraph were the seventh anniversary of the change of identification or, if later, the date so specified.

(5) Discharges of urban waste water from agglomerations with a population equivalent of between 10,000 and 150,000 to coastal waters which are in high natural dispersion areas, and such discharges from agglomerations with a population equivalent of between 2,000 and 10,000 into estuaries which are in high natural dispersion areas, may be subjected to less stringent treatment than that described in paragraph (1) above so long as–

(a) the discharges receive at least primary treatment in conformity with the control procedures set out in Part II of Schedule 3; and

(b) the river purification authority within whose area the discharges are made has certified that it is satisfied that comprehensive studies have indicated that such discharges will not adversely affect the environment.

(6) The river purification authority shall provide the Secretary of State with such information concerning the studies mentioned in paragraph (5)(b) above, as he may require for the purpose of enabling him to comply with Article 6.2 of the Directive.

(7) Treatment plants which provide appropriate treatment of urban waste water entering collecting systems shall be provided by 31 December 2005 in respect of–

(a) discharges to freshwaters and estuaries from agglomerations with a population equivalent of less than 2000; and

(b) discharges to coastal waters from agglomerations with a population equivalent of less than 10,000.

(8) In this regulation–

(a) "appropriate treatment" means treatment of urban waste water by any process and/or disposal system which after discharge allows the receiving waters to meet the relevant quality objectives and the relevant provisions of the Directive and other Community Directives;

(b) "primary treatment" means treatment of urban waste water by a physical and/or chemical process involving settlement of suspended solids, or other processes in which the BOD5 of the incoming waste water is reduced by at least 20% before discharge and the total suspended solids of the incoming waste water are reduced by at least 50%;

(c) "secondary treatment" means treatment of urban waste water by a process generally involving biological treatment with a secondary settlement or other process in which the requirements established in Table 1 of Schedule 3 are respected.

Discharges from treatment plants

6.— (1) Discharges from urban waste water treatment plants described in regulation 5 (including any such plants which are provided other than by a local authority) shall satisfy the relevant requirements of Part I of Schedule 3.

(2) It shall be the duty of every river purification authority, in exercising its functions under Part II of the Control of Pollution Act 1974(a) (control of water pollution), to secure–

(a) with respect to any such discharge as is described in paragraph (1) above, that the requirements referred to in that paragraph are satisfied;

(b) with respect to any discharge described in paragraph (5) or (7) of regulation 5 (including any such discharge from an urban waste treatment plant which is provided other than by a local authority), that the requirements of the said paragraph (5) or, as the case may be, the said paragraph (7) are satisfied;

(c) with respect to any discharge from a collecting system described in regulation 4 or an urban waste water treatment plant described in regulation 5, the limitation of pollution of receiving waters due to storm water overflows;

(d) with respect to any discharge of sludge–

(i) that the discharge of sludge to surface waters is phased out by 31 December 1998; and

(ii) that the total amount of toxic, persistent or bioaccumulable materials in the sludge which may be discharged to surface waters pursuant to consents under the said Part II is controlled by such consents and progressively reduced during the period ending on that date.

(3) Every river purification authority shall at regular intervals review and, if necessary for the purposes of complying with this regulation, modify or revoke consents given under the said Part II.

(a) 1974 c.40.

(4) Nothing in section 38 of the Control of Pollution Act 1974 shall restrict the power of a river purification authority to modify or revoke a consent in pursuance of the duty imposed by this regulation.

(5) All lochs and ponds shall be treated as controlled waters for the purposes of section 32 of the Control of Pollution Act 1974(a)(water pollution offences) insofar as those sections relate to the discharge of waste water from urban waste water treatment plants.

(6) In this regulation "river purification authority" includes the Secretary of State in respect of every consent given or deemed to be given by him by virtue of the Control of Pollution (Discharges by Islands Councils) (Scotland) Regulations 1993(b).

Discharges of industrial waste water to collecting systems or treatment plants

7.— (1) It shall be the duty of every local authority and of the Secretary of State, in exercising their respective functions under Part II of the Sewerage (Scotland) Act 1968 (trade effluent) with respect to any discharge on or after 31 December 1993 of industrial waste water, to secure that the requirements of Schedule 4 are met in respect of that discharge.

(2) Nothing in section 29(1) or (3) of that Act (decision on application) shall restrict the power of a local authority to impose in any consent or by direction under the said Part II such conditions as are necessary to comply with paragraph (1) above.

(3) Section 36(4) of that Act shall be disapplied in any case where a local authority has made a direction under subsection (1) of that section imposing such conditions on

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(a)1974 c.40; section 32 was substituted by the Water Act 1989 (c.15), Schedule 23, paragraph 4 and amended by the Environmental Protection Act 1990 (c.15), Schedule 15, paragraph 16(3).

(b)S.I. 1993/1156.

continuation of an existing discharge (within the meaning of the said Part II) as are necessary to comply with paragraph (1) above.

(4) Notwithstanding the terms of section 37(6) of that Act–

(a) nothing in any agreement entered into between a local authority and the owner or occupier of premises used or intended to be used for carrying on any trade or industry shall obviate the requirement for the consent of the local authority to any discharge of trade effluent from those premises unless the terms of the agreement are such as will secure that the requirements of Schedule 4 are met in respect of any discharge on or after 31 December 1993 to which the agreement relates;

(b) and for the purposes of complying with paragraph (1) above, a local authority may review by direction the making of the discharge to which any such agreement relates and accordingly sections 26 to 32 and 36 of that Act shall apply to such a discharge,

and any such agreement shall not be enforceable if and to the extent that it permits any discharge of industrial waste water on or after 31 December 1993 in respect of which the requirements of Schedule 4 are not met.

(5) Every local authority shall at regular intervals review and, if necessary for the purposes of complying with this regulation, modify consents granted under the said Part II and shall at regular intervals review, if so necessary, directions made thereunder.

(6) Nothing in the said Part II shall restrict the power of a local authority to modify a consent or, as the case may be, review a direction in pursuance of the duty imposed by this regulation.

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Dumping of sludge from ships

8.— (1) It shall be the duty of the licensing authority (within the meaning of the Food and Environment Protection Act 1985(a)), in the exercise of its functions under Part II of that Act (deposits in the sea), to secure that–

(a) the dumping of sludge from ships to surface waters is phased out by 31 December 1998; and

(b) the total amount of toxic, persistent or bioaccumulable materials in sludge so disposed of is licensed for disposal and progressively reduced in the period ending on that date.

[Samples and records

9.— (1) In this regulation–

(a) a "relevant condition" means a condition imposed in a consent under Part II of the Control of Pollution Act 1974 pursuant to regulation 6(2);

(b) "the operator" means, in relation to a relevant condition, the person who operates the urban waste water treatment plant, discharges from which are authorised by the consent in which that condition is imposed.

(2) Where the operator is required by a relevant condition to provide any apparatus for the purpose of collecting samples of waste water, any such apparatus shall, in any proceedings under Part II of the Control of Pollution Act 1974, be presumed to register accurately unless the contrary is shown.

(a) 1985 c.48.

(3) Any record produced by any such apparatus as is mentioned in paragraph (2) above shall, in any proceedings under Part II of the Control of Pollution Act 1974, be [sufficient] evidence of the matter appearing from the record and shall be admissible in evidence against the operator.

(4) Where, in compliance with a relevant condition, a sample of waste water is collected by apparatus installed for the purpose of collecting such samples automatically, the sample shall be treated, for the purpose of section 19 of the Rivers (Prevention of Pollution) (Scotland) Act 1951(a) (power to take samples of effluents) as being taken by the river purification authority under that section only at the time when it is removed from that apparatus, and in any proceedings under Part II of the Control of Pollution Act 1974 it shall be presumed, unless the contrary is shown, that any sample of waste water removed from that apparatus is a sample of what was passing from the urban waste water treatment plant into receiving waters.]

Monitoring

10.— (1) It shall be the duty of every river purification authority–

(a) to monitor or procure the monitoring by a competent authority or appropriate body of discharges from urban waste water treatment plants within its area to verify compliance with the relevant requirements of Part I of Schedule 3 in accordance with the control procedures set out in Part II of that Schedule;

(b) to monitor or procure the monitoring by a competent authority or appropriate body of amounts and composition of sludges disposed of to surface waters within its area (other than by means of dumping from ships);

(a) 1951 c.66; section 19(2) was substituted by the Rivers (Prevention of Pollution) (Scotland) Act 1965 (c.13), section 10(6); and section 19(3) was amended by the Water Act 1989 (c.15), Schedule 25, paragraph 17.

(c) to monitor or procure the monitoring by a competent authority or appropriate body of waters subject to discharges from urban waste water treatment plants within its area provided in accordance with regulation 5 in cases where it can be expected that the receiving environment will be significantly affected;

(d) to carry out or procure the carrying out by a competent authority or appropriate body of monitoring and any other relevant studies to verify that discharges within its area to which regulation 5(5) applies and the disposal of sludge to surface waters within its area do not adversely affect the environment.

(2) It shall be the duty of the licensing authority (within the meaning of the Food and Environment Protection Act 1985)–

(a) to monitor or procure the monitoring by a competent authority or appropriate body of amounts and composition of sludges disposed of to surface waters by means of dumping from ships;

(b) to carry out or procure the carrying out by a competent authority or appropriate body of monitoring and any other relevant studies to verify that the disposal of sludge to surface waters by means of dumping from ships does not adversely affect the environment.

(3) Each river purification authority and the licensing authority shall retain any information collected by them or by a competent authority or appropriate body in complying with paragraph (1) or (2) above and shall make it available to the Secretary of State on request.

Deposit of maps and certificates

11. Each river purification authority shall keep available at its principal office, at all reasonable times, for inspection by the public free of charge–

(a) the maps referred to in the definition of "estuary" in regulation 2(1), which relate to estuaries wholly or partly within its area;

(b) the maps of sensitive and high natural dispersion areas deposited with the authority under regulation 3(3);

(c) particulars of certificates issued by it under regulations 4(2), 5(3) and 5(5)(b).

Information required in connection with implementation of the Directive

12.— (1) It shall be the duty of every local authority and river purification authority to give to the Secretary of State such information as he may by notice require to enable him to fulfil the obligations imposed on him–

(a) under Article 16 of the Directive to publish every two years a situation report on the disposal of urban waste water and sludge in Scotland; and

(b) under Article 17 of the Directive to establish, update and provide the Commission with information on a programme for implementation of the Directive.

(2) Any such notice may specify the form and manner in which, the period within which or the times at which such information is to be given.

Enforcement of duties imposed on local authorities ~~and river purification authorities~~

13.— (1) If the Secretary of State is satisfied that a local authority has failed to do anything it is required to do by or under regulation 4, 5, 7 or 12 of these Regulations, or is likely to do so, he may, subject to paragraph (2) below, make an order declaring the authority to be in default and directing it for the purpose of remedying the default to take such steps and within such time or times as may be specified in the order.

(2) The Secretary of State shall be obliged to make an order under paragraph (1) above unless he is satisfied–

(a) that the failure or the apprehended failure was of a trivial nature; or

(b) in the case of an apprehended failure, that the authority has given, and is complying with, an undertaking to take all such steps as it appears to the Secretary of State to be appropriate, for the time being, for it to take for the purpose of securing or facilitating compliance with the duty in question.

(3) If the authority declared to be in default by such an order fails to comply with any requirement thereof within the time specified therein for compliance, the Court of Session may, on the application of the Lord Advocate on behalf of the Secretary of State, order specific performance of the duty in respect of which there has been default, and do otherwise as to the Court appears to be just.

Parliamentary Under Secretary of State,
Scottish Office

St. Andrew's House
Edinburgh
1993

SCHEDULE 1

Regulation 3

PART I

CRITERIA FOR IDENTIFICATION OF SENSITIVE AREAS

A water body must be identified as a sensitive area if it falls into one of the following groups:

(a) natural freshwater lochs, other freshwater bodies, estuaries and coastal waters which are found to be eutrophic or which in the near future may become eutrophic if protective action is not taken.

The following elements might be taken into account when considering which nutrient should be reduced by further treatment:

(i) lochs and streams reaching lochs/reservoirs/closed bays which are found to have a poor water exchange, whereby accumulation may take place. In these areas, the removal of phosphorus should be included unless it can be demonstrated that the removal will have no effect on the level of eutrophication. Where discharges from large agglomerations are made, the removal of nitrogen may also be considered;

(ii) estuaries, bays and other coastal waters which are found to have a poor water exchange, or which receive large quantities of nutrients. Discharges from small agglomerations are usually of minor importance in those areas, but for large agglomerations, the removal of phosphorus and/or nitrogen should be included unless it can be demonstrated that the removal will have no effect on the level of eutrophication;

(b) surface freshwaters intended for the abstraction of drinking water which could contain more than the concentration of nitrate laid down under the relevant provisions of Council Directive 75/440/EEC of 16 June 1975 concerning the quality required of surface water intended for the abstraction of drinking water in the Member States(a) if action is not taken;

(c) areas where further treatment than secondary or equivalent treatment is necessary to fulfil Council Directives.

PART II

CRITERIA FOR IDENTIFICATION OF HIGH NATURAL DISPERSION AREAS

A marine water body or area can be identified as a high natural dispersion area if the discharge of waste water does not adversely affect the environment as a result of morphology, hydrology or specific hydraulic conditions which exist in that area.

When identifying high natural dispersion areas, the Secretary of State shall take into account the risk that the discharged load may be transferred to adjacent areas where it can cause detrimental environmental effects. The Secretary of State shall recognise the presence of sensitive areas outside Scotland.

The following elements shall be taken into consideration when identifying high natural dispersion areas:

open bays, estuaries and other coastal waters with a good water exchange and not subject to eutrophication or oxygen depletion or which are considered unlikely to become eutrophic or to develop oxygen depletion due to the discharge of urban waste water.

(a)OJ No.L194, 25.7.75, p26; as amended by Directive 79/869/EEC (OJ No.L271, 29.10.79, p.44).

SCHEDULE 2

Regulation 4

REQUIREMENTS FOR COLLECTING SYSTEMS

1. Collecting systems shall take into account waste water treatment requirements.

2. The design, construction and maintenance of collecting systems shall be undertaken in accordance with the best technical knowledge not entailing excessive costs, notably regarding–

(a) volume and characteristics of urban waste water;

(b) prevention of leaks;

(c) limitation of pollution of receiving waters due to storm water overflows.

SCHEDULE 3

Regulations 5, 6 and 10

PART I

REQUIREMENTS FOR DISCHARGES FROM TREATMENT PLANTS

1. Treatment plants shall be designed or modified so that representative samples of the incoming waste water and of treated effluent can be obtained before discharge to receiving waters.

2. Discharges from urban waste water treatment plants subject to treatment in accordance with regulation 5(1) and (2) shall, subject to paragraphs 4 and 5 of Part II of this Schedule, meet the requirements shown in Table 1 below.

3. Discharges from urban waste water treatment plants to those sensitive areas which are subject to eutrophication as identified in sub-paragraph (a) of Part I of Schedule 1 shall, subject to paragraphs 4 and 5 of Part II of this Schedule, also meet the requirements in Table 2 below.

4. More stringent requirements than those shown in Table 1 and/or Table 2 shall be applied where required to ensure that the receiving waters satisfy any other relevant Community Directives.

5. The points of discharge of urban waste water shall be chosen, as far as possible, so as to minimise the effects on receiving waters.

TABLE 1

REQUIREMENTS FOR DISCHARGES FROM URBAN WASTE WATER TREATMENT PLANTS SUBJECT TO REGULATION 5(1) AND (2)

The values for concentration or for the percentage of reduction shall apply

Parameters	*Concentration*	*Minimum percentage of reduction*[1]	*Reference method of measurement*
Biochemical oxygen demand (BOD5 at 20°C) without nitrification[2]	25 mg/1 0_2	70-90	Homogenized, unfiltered, undecanted sample. Determination of dissolved oxygen before and after five-day incubation at 20°C ± 1°C, in complete darkness. Addition of a nitrification inhibitor.
Chemical oxygen demand (COD)	125 mg/1 0_2	75	Homogenized, unfiltered, undecanted sample Potassium dichromate.

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(1) Reduction in relation to the load of the influent.

(2) The parameter can be replaced by another parameter: total organic carbon (TOC) or total oxygen demand (TOD) if a relationship can be established between BOD5 and the substitute parameter.

Analyses concerning discharges from lagooning shall be carried out on filtered samples; however, the concentration of total suspended solids in unfiltered water samples shall not exceed 150 mg/l.

TABLE 2

REQUIREMENTS FOR DISCHARGES FROM URBAN WASTE WATER TREATMENT PLANTS TO SENSITIVE AREAS WHICH ARE SUBJECT TO EUTROPHICATION AS IDENTIFIED IN SUB-PARAGRAPH (a) OF PART I OF SCHEDULE 1

One or both parameters may be applied depending on the local situation. The values for concentration or for the percentage of reduction shall apply.

Parameters	*Concentration*	*Minimum percentage of reduction* (1)	*Reference method of measurement*
Total phosphorus	2 mg/1 P (10,000 - 100,000 p.e.) 1mg/1 P (more than 100,000 p.e.)	80	Molecular absorption spectrophotometry
Total nitrogen (2)	15 mg/1 N (10,000 - 100,000 p.e.) 10 mg/1 N (more than 100,000 p.e.)(3)	70-80	Molecular absorption spectrophotometry

(1) Reduction in relation to the load of the influent.

(2) Total nitrogen means: the sum of total Kjeldahl-nitrogen (organic N + NH_3), nitrate (NO_3)-nitrogen and nitrite (NO_2)-nitrogen.

(3) Alternatively, the daily average must not exceed 20 mg/1 N. This requirement refers to a water temperature of 12°C or more during the operation of the biological reactor of the waste water treatment plant. As a substitute for the condition concerning the temperature, it is possible to apply a limited time of operation, which takes into account the regional climatic conditions. This alternative applies if it can be shown that paragraph 1 of Part II of this Schedule is fulfilled.

PART II

REFERENCE METHODS FOR MONITORING AND EVALUATION OF RESULTS

1. (a) Each river purification authority shall apply a monitoring method which corresponds at least with the level of requirements described below.

(b) Alternative methods to those mentioned in paragraphs 2, 3 and 4 may be used provided that it can be demonstrated that equivalent results are obtained.

(c) Each authority shall provide the Secretary of State with all relevant information concerning the applied method.

2.(a) Flow-proportional or time-based 24-hour samples shall be collected at the same well-defined point in the outlet and if necessary in the inlet of the treatment plant in order to monitor compliance with the requirements for discharged waste water laid down in the Regulations.

(b) Good international laboratory practices aiming at minimising the degradation of samples between collection and analysis shall be applied.

3. The minimum annual number of samples shall be determined according to the size of the treatment plant and be collected at regular intervals during the year:

- 2,000 to 9,999 p.e.: 12 samples during the first year;

  four samples in subsequent years, if it can be shown that the water during the first year complies with the provisions of these Regulations; if one sample of the four fails, 12 samples must be taken in the year that follows;
- 10,000 to 49,999 p.e.: 12 samples;
- 50,000 p.e. or over: 24 samples.

4. The treated waste water shall be assumed to conform to the relevant parameters if, for each relevant parameter considered individually, samples of the water show that it complies with the relevant parametric value in the following way:

(a) for the parameters specified in Table 1 and sub-paragraph (b) of regulation 5(8), a maximum number of samples which are allowed to fail the requirements, expressed in concentrations and/or percentage reductions in that Table and that sub-paragraph, is specified in Table 3;

(b) for the parameters of Table 1 expressed in concentrations, the failing samples taken under normal operating conditions must not deviate from the parametric values by more than 100%;

(c) for those parameters specified in Table 2 the annual mean of the samples for each parameter shall conform to the relevant parametric values.

5. Extreme values for the water quality in question shall not be taken into consideration when they are the result of unusual situations such as those due to heavy rain.

TABLE 3

Series of samples taken in any year	*Maximum permitted number of samples which fail to conform*
4- 7	1
8-16	2
17-28	3
29-40	4
41-53	5
54-67	6
68-81	7
82-95	8
96-110	9
111-125	10
126-140	11
141-155	12
156-171	13
172-187	14
188-203	15
204-219	16
220-235	17
236-251	18
252-268	19
269-284	20
11 05 93 0265	25

Series of samples taken in any year	*Maximum permitted number of samples which fail to conform*
285-300	21
301-317	22
318-334	23
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SCHEDULE 4

Regulation 7

INDUSTRIAL WASTE WATER

Industrial waste water entering collecting systems and urban waste water treatment plants shall be subject to such pre-treatment as is required in order to–

- protect the health of staff working in collecting systems and treatment plants;
- ensure that collecting systems, waste water treatment plants and associated equipment are not damaged;
- ensure that the operation of the waste water treatment plant and the treatment of sludge are not impeded;
- ensure that discharges from the treatment plants do not adversely affect the environment, or prevent receiving water from complying with other Community Directives;
- ensure that sludge can be disposed of safely in an environmentally acceptable manner.

DRAFT: 4 June 1993 - for consultation

THE URBAN WASTE WATER TREATMENT SCOTLAND REGULATIONS 1993: A GUIDANCE NOTE ISSUED BY THE SCOTTISH OFFICE ENVIRONMENT DEPARTMENT

1 INTRODUCTION

1.1 The Secretary of State considers that it will be useful, particularly for local authorities and other dischargers and for the River Purification Authorities to have available to them some guidance on the implementation and interpretation of the Urban Waste Water Treatment Scotland Regulations 1993.

1.2 The European Commission's (EC) draft proposal for a directive concerning municipal waste water treatment (later to be known as the Urban Waste Water Treatment Directive) was published by the EC in late 1989 and adopted by the Council in May 1991. It is this Directive that these Regulations transpose into legislation for Scotland.

1.3 The main objective of the Urban Waste Water Treatment (UWWT) Directive is to ensure that all significant discharges of sewage are treated before they are discharged either to inland surface waters, estuaries or coastal waters. For the purpose of the Directive, significant discharges are those to fresh waters or to estuaries serving agglomerations with population equivalents (sometimes abbreviated as pe) of more than 2,000, or those to coastal waters serving agglomerations with population equivalents of more than 10,000. Sewage will normally be treated to secondary treatment (biological) standards, but in estuarine and coastal areas with high natural dispersion characteristics primary treatment is acceptable in certain cases. Discharges into areas identified as "sensitive" will require more stringent treatment. Among other things, the Directive also requires appropriate treatment to be provided for discharges from smaller agglomerations and an end to the dumping of sewage sludge at sea.

1.4 The compliance dates given in the Directive range from 1998 to 2005 depending on the size of the agglomeration and location of the discharge. Separate provisions in the Directive refer to a number of industrial sectors, the discharges from which, in terms of BOD and solids are of a similar nature to domestic sewage.

2 THE REGULATIONS: GENERAL

2.1 The Urban Waste Water Treatment Scotland Regulations 1993 (SI 1993 No) transpose into legislation the requirements of the Urban Waste Water Treatment Directive (91/271/EEC). For the most part, the Regulations adopt the wording of the Directive but their order is different from the Articles of the Directive.

2.2 The Secretary of State considers that some parts of the Regulations require a degree of interpretation. The purpose of the following guidance is therefore to advise organisations, in particular local authorities and the environmental regulators, on the implementation of the Regulations. Much of the guidance has been drawn up with the assistance or advice of the River Purification Authorities (RPAs); Government Departments; and local authorities who are the statutory sewerage undertakers. They have all agreed the content of the Annexes.

Status of guidance note

2.3 This guidance note may be updated and amended to reflect experience gained in the practical implementation of the Regulations. It must be borne in mind, however, that only the Courts can give authoritative decisions on interpretation of the Regulations. In addition, an EC Committee with a regulatory role (henceforth referred to as the Regulatory Committee) has also been set up under the terms of the Directive to oversee its implementation. This will continue to provide a forum for discussing interpretation of the Directive's requirements and the exchange of ideas with other Member States. Should the Regulatory Committee propose and adopt amendments to those parts of the Directive with which it is concerned, or reach formal decisions about interpretation of any similar requirement of the Directive, its decisions will be the subject of further guidance as appropriate.

3 REGULATION 2: INTERPRETATION

3.1 **Estuary:** the maps showing the upper and outer limits of estuaries (see regulation 11(a)) have been drawn up by the Department. The outer limits have been determined as either:

3.1.1. - a line between such topographical features as define the outer boundary of the estuary; or

3.1.2. - the place where the waters on a depth averaged basis have a salinity of 95% of the adjacent seawater for 95% of the time.

4 REGULATION 3: SENSITIVE AREAS AND AREAS WITH HIGH NATURAL DISPERSION

Identification

4.1 Regulation 3(1) requires the Secretary of State to identify sensitive areas by 31 December 1993 and enables him to identify, by the same date, areas with high natural dispersion characteristics. The identification is to be undertaken in accordance with the criteria set out in Schedule 1 of the Regulations. Those criteria have been elaborated as indicated in Annex B to the Department's Consultation Document entitled "Methodology for Identifying Sensitive Areas (Urban Waste Water Treatment Directive) and Designating Vulnerable Zones (Nitrates Directive) in Scotland" published on 2 April 1993. That document uses the term "less sensitive areas", taken from the Directive. However, the criteria for identification of such areas actually relates to their good water exchange, which makes them less vulnerable to any harmful effects from discharges. The term used in UK legislation therefore refers to these high natural dispersion characteristics.

4.2 The RPAs will propose candidate areas to the Secretary of State based on the criteria as elaborated. The Secretary of State will formally identify both sensitive areas and high natural dispersion areas based on the RPAs' expert advice. The extent of sensitive areas will be determined in accordance with rules established following public consultation on the proposals contained in the methodology consultation paper. Regulation 3(3) provides for maps showing the location and limits of identified areas to be deposited with the RPAs by the Secretary of State.

Review

4.3 Regulation 3(2) requires a review of the identification of sensitive areas and high natural dispersion areas at intervals of no more than four years. The Secretary of State will conduct this review by, in the first instance, formally directing the RPAs to repeat a similar evaluation exercise and review and to propose additions or changes where appropriate.

5 REGULATION 4: DUTY TO PROVIDE AND MAINTAIN COLLECTING SYSTEMS AND TREATMENT PLANTS

Provision and maintenance of collecting systems

5.1 Regulation 4(1) requires the local authorities to ensure that collecting systems are provided by the dates specified and that they satisfy certain standards as to design and other matters. Each date specified reflects the Directive's requirements according to the size of the agglomeration and the nature and sensitivity of the receiving waters.

5.2 The standards for the design, construction, operation and maintenance of collecting systems which are to apply to the systems themselves are set out in Schedule 2 to the Regulations. The provisions mirror the Directive, which sets out only minimum standards, and does not indicate how they might be achieved. Annex A to this guidance document gives some practical and useful elaboration. It lists reference material which together reflects current practice in Scotland and which the Secretary of State considers should be used as guidelines for satisfying the requirements of the Regulations. There will of course be continuing developments in technology and the guidance should not be seen as in any way restricting the local authorities in their use of new or equally adequate advice or technology.

Exceptions to the requirement to provide collecting systems

5.3 Regulation 4(2) provides that where no environmental benefit will accrue or where excessive costs will be incurred, no collecting system need be provided. This is subject to the provision of alternative systems and to certain additional safeguards. Those safeguards require the local authorities first to obtain from the RPAs or the Secretary of State a certificate confirming that the exceptional circumstances claimed do indeed exist. In practice, the local authority will be expected first to apply to the RPA for a certificate that a collecting system will produce no environmental benefit. If it is refused and a case can be made for an exception on the grounds of cost, then that case may be put to the Secretary of State. The Secretary of State will normally seek the relevant RPA's views before considering applications on the grounds of cost.

Provision of treatment plants

5.4 Regulation 4(3) imposes a duty on local authorities to provide sewage treatment plants as specified in regulation 5 and to ensure that urban waste water entering them is treated as so specified.

Standards for treatment plants

5.5 Regulation 4 (3)(a) sets out requirements in relation to the design, construction, operation and maintenance of sewage treatment works. The requirement is that standards should "ensure sufficient performance under all normal local climatic conditions". Sufficient performance means performance which will achieve compliance with the treatment standards set out in the Regulations. Once again, however, the Regulations give no indication of the design standards that will achieve the objective. Therefore, the Secretary of State has provided guidelines at Annex A, along with those relating to collecting systems, and on the same flexible basis. In addition, the definition of unusual weather conditions in Annex H is relevant.

Re-use and disposal of sewage sludge and treated waste water

5.6 Regulation 4(3)(b) imposes a duty on local authorities to ensure that treated waste water and sludge are re-used whenever appropriate.

5.7 Regulation 4(3)(c) imposes a further duty on local authorities to ensure that disposal routes for treated waste water and sludge minimise the effects on the environment. The Secretary of State takes this requirement to mean, in relation to sludge, that the overall combination of disposal routes chosen (eg incineration, landfill, agricultural spreading) must minimise the adverse effects on the environment. The new duty is consistent with local authorities' existing general duty under Section 1 of the Sewerage (Scotland) Act 1968 to provide sewerage systems, together with their existing responsibility for disposing of the sludge that they produce and the selection of disposal routes.

5.8 In the case of treated waste water, the disposal route is normally the adjacent watercourse, the discharge into which is enforced through the RPAs' consenting procedures.

6 REGULATION 5: REQUIREMENTS AS TO TREATMENT PLANTS

6.1 When considering the various requirements for discharge standards, readers should also note the part of this Guidance Note which offers explanation of those standards as set out in Schedule 3.

Provision of the "normal" level of secondary treatment

6.2 Regulation 5(1) sets out the dates by which sewage discharges of various sizes must be subjected to secondary treatment, as defined in regulation 5(8)(c), if the receiving waters have not been identified as either sensitive areas or high natural dispersion areas. Regulation 5(1)(a) additionally ensures that, should the European Commission agree to an extension of time for compliance, this would not result in a breach of national legislation.

Provision of more stringent treatment than secondary treatment in sensitive areas

6.3 Regulation 5(2) requires that where there is a discharge from an agglomeration greater than 10,000 (pe) affecting a sensitive area, treatment more stringent than secondary treatment must be provided by 31 December 1998. Where the waters are identified as sensitive by the criterion of eutrophication, more stringent treatment will mean that the discharge will be required to meet the standards set out in Schedule 3, Part I, Table 2 for phosphorus or nitrogen or both.

6.4 In the case of areas identified as sensitive on the basis of the nitrate levels in surface waters abstracted for drinking water, "more stringent" treatment might involve some form of nitrogen removal. Action taken simultaneously under measures required by the EC Directive concerning the protection of waters against pollution caused by nitrates from agricultural sources will also contribute to the reduction in nitrate levels. Decisions as to the degree of nitrogen removal required at sewage treatment works serving an agglomeration with a population equivalent greater than 10,000 will be taken on a catchment by catchment basis by the relevant RPAs.

6.5 In areas identified as sensitive in order to fulfil the requirements of other Directives, such as the Habitats Directive, consideration of the form of "more stringent" treatment will require consideration by the regulators on the basis of the particular effect that a discharge may be having in individual circumstances.

Alternative measures in sensitive areas

6.6 Regulation 5(3) allows an alternative approach based on an overall reduction of both the phosphorus and nitrogen content of discharges to a sensitive area. If both the phosphorus and nitrogen content of the combined load entering all sewage treatment works in a sensitive area can be reduced by 75% - ie both the phosphorus and nitrogen content of the combined discharges to the receiving waters is reduced to no more than 25% of that which entered all the works taken together - then the requirement to install more stringent treatment at individual sewage treatment works serving an agglomeration with a population equivalent greater then 10,000 in the sensitive area, need not apply. In practice, this overall reduction in nutrients may be achieved by selecting a number of sewage treatment works, of any size, to receive more stringent treatment. It will be for the appropriate RPAs to certify their satisfaction that the minimum percentage reduction is achieved. The appropriate RPA, for certification purposes, will be the authority in whose area the treatment plants are situated since the discharge will be monitored immediately after treatment to ascertain whether or not the required minimum percentage of reduction of the overall load has been achieved.

6.7 Regulation 5(4) provides that, where, following a review, new sensitive areas are identified or high natural dispersion areas cease to be so identified, the discharges into the waters concerned must be brought up to the required standards within seven years. The length of this period reflects the need to provide new or upgraded sewage treatment facilities, including the time needed to obtain planning permission and to construct and fit out works.

Provision of less stringent treatment than secondary treatment in high natural dispersion areas

6.8 Regulation 5(5) allows discharges to receive less stringent treatment than secondary treatment, but at least primary treatment, where the receiving waters have been identified as having high natural dispersion characteristics. A definition of primary treatment is given in regulation 5(8)(b) and expanded in Annex B to this guidance note. The acceptance of this lower level of treatment is dependent on the relevant RPAs having certified that it is satisfied that comprehensive studies have indicated that there will be no adverse effect on the environment.

Comprehensive studies will involve, where appropriate, consultation with neighbouring RPAs and the extension of these studies to those neighbouring areas sufficient to enable the authority in whose area the discharges are made to be satisfied about their effect on the environment. The Department is considering, with advice from the Marine Pollution Monitoring and Management Group, proposals concerning the comprehensive studies that must be undertaken and details are given in Annex C. This Group comprises representatives of organisations responsible for monitoring the marine environment. It advises the Government on related matters. The studies are to be carried out according to this formulation and financed by the dischargers. The sequence of events will be that the high natural dispersion areas will be identified according to the agreed criteria referred to in paragraph 4.1 above; the comprehensive studies will be carried out; only then will the RPAs, if they are satisfied, issue consents for primary treatment.

6.9 Regulation 5(7) requires the provision of appropriate treatment for small discharges. It applies to agglomerations of less than 2,000 pe discharging to fresh waters or estuaries which are served by a collecting system and simply ensures that where a collecting system for such a small discharge does exist, the discharge is treated appropriately. It also requires appropriate treatment for discharges to coastal waters from agglomerations less than 10,000 pe where they are served by collecting systems. Such agglomerations are required to have collecting systems if they are greater than 2,000 pe (Regulation 4(1)).

6.10 The definition of "appropriate treatment" given in regulation 5(8)(a), however, relies on "relevant quality objectives" for the receiving waters, even though no quality objectives for receiving waters are laid down in the Directive. For the avoidance of doubt, the RPAs intend to apply the principles set out in Annex D when setting consents for treatment for the small discharges addressed by this regulation.

7 REGULATION 6: DISCHARGES FROM TREATMENT PLANTS

Treatment standards for discharges from ALL sewage treatment works

7.1 Regulation 6(1): sets out the requirements for treatment standards for all discharges from sewage treatment works. The requirements applicable to discharges into waters of varying sensitivities are indicated in Part I of Schedule 3 which is addressed later in this guidance note. The requirements apply equally whether or not works are operated by the local authorities. In addition, the concept of Crown Immunity is not recognised under EC Directives, so that sewage treatment works operated by establishments which currently enjoy such protection from the RPA's consenting procedures will not be immune from the Directive's requirements.

Discharge consents

7.2 Regulation 6(2) places a duty on the RPAs to ensure, through their discharge consenting powers, that the relevant treatment standards are met for all discharges from sewage treatment works; that pollution from storm water overflows is limited (see Annex E); that sewage sludge is not discharged through pipelines to surface waters after 31 December 1998 and that both the amount of and the harmful contaminants in the sludge are progressively reduced until that date. Because the consenting procedures are already embodied in legislation under the Control of

Pollution Act 1974, as amended, and because those provisions include enforcement powers and provide for significant penalties in respect of any breach of water pollution legislation, those same powers of enforcement and penalties on conviction will apply to breaches of these Regulations.

7.3 Regulation 6(3) and (4) provide that the RPAs should review regularly the discharge consents they give to achieve compliance with these Regulations and that, in so doing, the requirements of these Regulations will override existing legislative restrictions on their powers of review. In most circumstances, the Secretary of State does not expect that reviews will be carried out at intervals of less than two years. The existing restrictions on the time allowed for reviewing consents will remain in force in relation to matters unconnected with the requirements of these Regulations.

7.4 In relation to matters unconnected with these Regulations, the RPAs' consenting and enforcement powers are restricted to "controlled waters". The definition of "controlled waters" contained in Section 30A of the Control of Pollution Act 1974, as amended, excludes lochs and ponds which do not drain into rivers. The effect of regulation 6(5) is that a consent will be required for the discharge of sewage effluent from treatment plants to any inland freshwaters, including those to which the RPAs' powers would not otherwise extend.

8. REGULATION 7: DISCHARGES OF INDUSTRIAL WASTE WATER TO COLLECTING SYSTEMS OR TREATMENT PLANTS

Consenting industrial discharges to sewer

8.1 Regulation 7(1) places all those who have power to consent, or review, or make agreements with industrial dischargers, as to matter permitted to be discharged to collecting systems or sewage treatment works, under a duty to ensure that those discharges meet the requirements set out in Schedule 4.

8.2 Annex I to this guidance note explains that current legislation enables local authorities to adopt practices which fit well with the requirements of this regulation and the objectives of Schedule 4.

8.3 Regulation 7(2) - (6) provides that none of the conditions of consent set out in the Sewerage (Scotland) Act 1968 shall be taken as restricting the conditions that may be imposed to secure compliance with these Regulations; that relevant agreements entered into under that Act will have no force after 31 December 1993 unless their provisions secure compliance with these Regulations; and, to mirror regulation 6(4), that x local authorities should review regularly their consents and authorisations given to achieve compliance with these Regulations and that, in so doing, the requirements of these Regulations will override existing legislative restrictions on their powers of review. Once again, in most circumstances, the Secretary of State would not expect reviews to be carried out at intervals of less than two years. Similarly, the existing restrictions on the time within which a review is allowed will remain in force in relation to matters unconnected with the requirements of these Regulations.

9. REGULATION 8: DUMPING OF SLUDGE FROM SHIPS

9.1 For the purposes of regulation 8, it is the The Scottish Office

Agriculture & Fisheries Department, which is the licensing authority, which is thereby placed under a duty to ensure that the dumping of sewage sludge at sea ceases by 31 December 1998 and that, in the meantime, the load of potentially harmful contaminants in the sewage sludge are progressively reduced.

10. REGULATION 9: SAMPLES AND RECORDS

Automatic composite samples

10.1 The effect of regulation 9 is to allow the RPAs to include in discharge consents conditions which will require the use of automatic sampling by apparatus provided by the operator of the sewage treatment works. The Regulations mirror the Directive's requirement for composite samples (Schedule 3 Part II para 2(a) -"Flow-proportional or time-based 24-hour samples") which can only reasonably be taken by automated means.

10.2 Regulation 9(4) links the concept of composite samples, taken mechanically, to the traditional sampling regime which is currently followed by the RPAs under the terms of existing pollution control legislation.

11. REGULATION 10: MONITORING

11.1 Regulation 10(1) and (2) place both the RPAs and The Scottish Office Agriculture & Fisheries Department under a duty to monitor, as set out in Schedule 3, such of the environmental requirements of the Regulations as are relevant to their functions. The required monitoring by the RPA will not necessarily be limited to monitoring by the authority within its own area. It may also involve co-operation with neighbouring RPAs, where appropriate. The Regulation enables the authorities and the Department to "procure monitoring" by using agents to undertake the necessary monitoring and studies. Guidelines on monitoring of discharges which are considered appropriate for Scotland are set out in Annex G to this guidance note.

11.2 Monitoring information is required to be made available to the Commission within six months of a request from them. Regulation 10(3) requires that such monitoring information obtained by the RPAs and The Scottish Office should be retained and made available to the Secretary of State for the purpose of complying with this obligation.

12 REGULATION 11: DEPOSIT OF MAPS AND CERTIFICATES

12.1 Regulation 11 requires the RPAs to keep available to the public maps showing the limits of estuaries; maps showing the location of sensitive areas and high natural dispersion areas; and all certificates issued by them in connection with their functions under the Regulations.

13. REGULATION 12: INFORMATION AND ASSISTANCE REQUIRED IN CONNECTION WITH CONTROL OF POLLUTION

13.1 Member States are required by the Directive to establish a programme for the implementation of the Directive by 31 December 1993 in accordance with Article 17. The format for supplying information on such a programme is still under discussion in the EC Regulatory Committee. The programme will be a vehicle whereby the local authorities establish investment priorities for provision of collecting systems and sewage treatment to the Directive's standards and establish timetables for construction and other necessary procedures so that standards are met by the due dates. Information about the Implementation Programme required to be established in respect of the Directive and situation reports must also be reported to the European Commission by the Member States. It is likely to be necessary to gather information from the RPAs and the local authorities in order to fulfil these obligations.

13.2 Regulation 12 therefore imposes a direct obligation on authorities to give the Secretary of State the information he needs to publish the situation reports and provide the Commission with information on the implementation programme.

14 REGULATION 13: ENFORCEMENT OF DUTIES IMPOSED ON LOCAL AUTHORITIES AND RIVER PURIFICATION AUTHORITIES

14.1 Regulation 13 reflects the obligation that the Secretary of State is under to ensure that Scotland's contribution to the UK's compliance with the Directive is achieved.

15 DISCHARGE OF CERTAIN INDUSTRIAL WASTE WATER INTO RECEIVING WATERS

15.1 Further regulations will be made later this year to implement Article 13 of the Directive.

16. SCHEDULE 1: CRITERIA FOR IDENTIFICATION OF SENSITIVE AREAS AND HIGH NATURAL DISPERSION AREAS

Sensitive areas

16.1 The criteria and procedures for identifying sensitive areas are set out in Part I of Schedule 1 and were the subject of a consultation paper published by the Secretary of State in the spring of 1992. The consultation was undertaken as an acknowledgement of the fact that the criteria in the Directive were given in only the broadest terms. In particular, it was recognised that eutrophication, being one of those broad criteria, describes a process rather than a state and studies have shown that it is controlled by a number of factors. One of the consultation paper's aims was to seek a measure of agreement on an expanded and more scientific definition of "eutrophic". The criteria agreed following this consultation have been published as indicated in paragraph 4.1 above.

High natural dispersion areas

16.2 The criteria for identifying high natural dispersion areas are set out in Part II of Schedule 1 of the Regulations and were the subject of the same consultation exercise referred to in paragraph 15.1 although they were referred to there as "less sensitive areas" (see paragraph 4.1 above). The content of the comprehensive studies has been referred to in paragraph 6.8 above.

17. SCHEDULE 2: REQUIREMENTS FOR COLLECTING SYSTEMS

Treatment requirements for waste water

17.1 Collecting systems are required by paragraph 1 of Schedule 2 to take into account waste water treatment requirements.

Design standards,etc

17.2 Paragraph 2 of Schedule 2 sets out broad requirements for the design, construction and maintenance of collecting systems. The design and construction requirements apply only to the construction of new sewers or sewers being refurbished. The requirements as to "best technical knowledge not entailing excessive costs" are taken into account in the list of documents in Annex A setting out current practice in Scotland. In addition, the considerations set out in Annex E to this paper will govern the limitation of pollution from storm water overflows.

18. SCHEDULE 3: REQUIREMENTS FOR DISCHARGES FROM TREATMENT PLANTS AND REFERENCE METHODS FOR MONITORING AND EVALUATION OF RESULTS

Requirements for discharges

18.1 Part I of Schedule 3 sets out requirements for treatment of discharges from all waste water treatment plants. Those set out in paragraphs 1 and 5 are applicable to all discharges, whatever level of treatment is to be provided. The existing discharge consenting procedure already takes account of the location of discharge points.

18.2 The requirements in paragraph 2 relate to discharges which are to receive either the norm of secondary treatment, or treatment more stringent than that because they discharge into sensitive areas. The requirements in paragraph 3 relate specifically to discharges into areas identified as sensitive by reason of eutrophication. The requirements in paragraph 4 relate only to discharges into areas identified as sensitive in order to meet the requirements of other Council Directives.

Table 1

18.3 In the view of the Secretary of State it will be appropriate in general to use the concentration value approach, rather than a minimum percentage of reduction, for the parameters BOD and COD. There is little operational experience in the UK relating to the use of COD as a control parameter for sewage works. Investigations of the limited data available appear to indicate that the concentration value approach is satisfactory for most sewage treatment works. However, there will be occasions when, although meeting the 25 mg/l BOD limit, it will be difficult for the works to conform to the COD value of 125 mg/l. This will be, for instance, when the discharge has an unusual trade waste content.

18.4 In such instances the Secretary of State proposes that the local authority should apply to the RPA for consideration of the use of the percentage reduction approach set out as an alternative in the Table. Under such circumstances the local authority will be required to provide evidence to support the case and will be required to install and operate sampling equipment at the inlet and outlet of works as appropriate in order to meet the needs for enforcement of this alternative standard. The switch to the percentage reduction approach in some circumstances is not expected to be lightly requested by the local authorities because of the additional monitoring burdens which it carries with it.

18.5 Table 1 in the Directive offers suspended solids as an optional parameter. The Secretary of State has decided not to include suspended solids in Table 1 in the Regulations. The RPAs' will continue to include suspended solids in consents where there are good environmental reasons for so doing. In these circumstances, compliance with the consents parameter will not be taken into account for determining compliance with the Directive.

Table 2

18.6 There is sufficient confusion as to the meaning of footnote (3) to Table 2 that the Regulatory Committee are considering offering clarification. Their advice will be the subject of further guidance in due course.

Reference methods for monitoring and evaluation

Composite and spot samples

18.7 Paragraph 2(a) of Schedule 3 requires composite samples to be taken. This is a departure from the RPAs' current normal practice which relies on spot samples. To effect a transition to these new sampling arrangements the Secretary of State has determined that the procedures set out below and in Annex F will apply.

18.8 Where existing discharge consents are less stringent than those of the Directive, the latter's standards will be introduced into consents in time to meet the Directive's compliance dates.

18.9 A research project to develop a statistical relationship between spot and composite samples is underway. Its results are expected by spring 1994. The results of the research project will be applied to convert existing consent standards which are more stringent than those of the Directive into composite standards. The conversion to equivalent composite standards is intended to be cost neutral and will be phased in prior to the Directive's implementation deadlines. Where it proves necessary to change an existing consent in the meantime, an interim statistical relationship as set out in Annex F will be used.

18.10 If any breach of the required standards occurs, only the breach of the Directive's standards, and not any breach of the more stringent national standards will be reported to the EC.

Normal operating conditions

18.11 Paragraph 4 (c) of Part II of Schedule 3 makes reference to "normal operating conditions" and paragraph 5 refers to "unusual situations such as those due to heavy rain". In addition, regulation 4(4)(a) requires treatment plants to perform sufficiently "under normal local climatic conditions". Annex H to this guidance note sets out the Secretary of State's views as to what "abnormal conditions" and "unusual situations" and "exceptional weather conditions" will be taken to mean, to aid interpretation of the exceptional circumstances when the norms of the Regulations need not apply.

18.12 Annex J also records the wording that the RPAs' have agreed will be introduced into their discharge consent conditions for all sewage treatment works to allow for unusual weather conditions. The consents will thus apply the provisions relating to exceptional weather to all parameters measured, even where they are not required to be measured by the Directive. The registers established under the Control of Pollution (Registers) Regulations will record if local authorities claim unusual conditions, and whether this claim is accepted or disputed by the RPAs.

19. SCHEDULE 4: INDUSTRIAL WASTE WATER

19.1 This Schedule sets out requirements in relation to discharges to sewer of industrial waste water. As explained in paragraph 8.2, the present practice described in Annex I fulfils the requirement of the Regulations.

DESIGN, CONSTRUCTION AND OPERATION OF COLLECTING SYSTEMS AND TREATMENT PLANT

1. INTRODUCTION

1.1 Regulation 4(1) contains provisions on the design, construction, operation and maintenance of collecting systems and regulation 4(3) contains provisions on the design, construction and maintenance of treatment plants to ensure sufficient performance. The provisions mirror the Directive, which sets out only minimum standards, and does not indicate how they might be achieved.

1.2 Listed below are the relevant appropriate documents which reflect current practice in the UK. The Secretary of State believes that these should be taken as guidelines which meet the requirements of the Regulations. However, many Manuals and Guidelines are regularly updated and changed to take account of new developments and improvements in technology. These guideline lists are therefore to be used in a manner which gives flexibility to achieve objectives without imposing unnecessary constraints which might inhibit initiatives.

2. COLLECTING SYSTEMS

2.1 Schedule 2 requires that Collecting Systems shall take into account waste water treatment requirements.

2.2 The design, construction and maintenance of collecting systems shall be undertaken in accordance with best technical knowledge not entailing excessive costs, notably regarding:

- volume and characteristics of urban waste water.

- prevention of leaks

- limitation of pollution of receiving waters due to storm water overflow.

2.3 The principal document which defines current UK practice is BS8005:1987 "Sewerage". This covers all aspects of design, construction, and maintenance. It makes reference to relevant supporting documentation including:

- Civil Engineering Specification for the Water Industry

- Sewers for Adoption (for England and Wales) 3rd Edition 1989

- The Wallingford Procedure
- The Sewerage Rehabilitation Manual
- The 1970 Ministry of Housing and Local Government Technical Committee's Report "Storm Overflows and the Disposal of Storm Sewerage" forms the basis for hydraulic design, with the provision for enhancement to meet particular environmental needs on a site specific basis. (MHLG 1970)

- Materials Selection Manual for Sewers, Pumping Mains and Manholes

2.4 There are further relevant documents which were issued recently.

... A Guide to Sewerage Operational Practices.

... Standard Specification for Water and Sewerage Schemes by the Scottish Association of Directors of Water and Sewerage Services, Third Edition.

In addition to the above there are a number of guides and documents available dealing with storm overflows and use of rainfall time series for sewer system modelling. In due course the Urban Pollution Management Manual will become available.

3. TREATMENT WORKS

3.1 There is no equivalent document to BS8005 in the field of treatment works design, construction, operation and maintenance. Principal aspects are dealt with below.

Design and Construction

3.2 Hydraulic Design: significant variations in generally accepted design criteria apply to meet specific consents and requirements of receiving waters but the following principles generally apply:

- Normal treatment capacity should be adequate to treat the diurnal variations in dry weather flow, for example 3 times dry weather flow for small to medium size works.
- Normal storm tank capacity is typically 2 hours at 3DWF

The 3 supporting documents which are relevant are:

- Hydraulics Research "Tables for the Hydraulic Design of Pipes and Sewers".
- BS 3640 Measurement of flows in Open Channel
- MHLG 1970

3.3 Process Design: no single document covers all aspects of process design.

Important references are:

- Manuals of British Practice in Water Pollution Control
- Preliminary treatment for Marine Outfalls, Users Guide. WRC 1989
- Design Guide for Marine Treatment Schemes, WRc 1990
- Technical Report TR11 "Settling of Activated Sludge", WRc 1973-

- Design Guide for Activated Sludge Processes, WRc for FWR, FR0090, 1990
- Guide on Nutrient Removal Process Selection WRc, FWR, FR0253, 1992
- Technical Report TR93 "The Design of Percolating Filters and Biological Contactors", WRc
- BS6297: 1983 Design and Installation of Small Sewage Treatment Works and Cesspools
- CIRIA TR119 Screenings and Grit in Sewage

3.4 Over many years WRc have worked with the water industry to produce a series of guides and documents covering most aspects of process design. These are incorporated to varying degrees in sewerage undertakers' design procedures.

3.5 There are numerous supporting documents and most sewerage undertakers have developed their own "design manuals" which are appropriate to their own needs. These tend to draw on best practice from a wide range of base documents including WRc guidelines.

3.6 Structural Design: the principal documents are:

- BS8110 The Use of Reinforced Concrete
- BS8007 Concrete in Water Retaining Structures
- BS5950 Structural Steelwork
- BS6031 Code of Practice for Earthworks
- BS8004 Code of Practice for Foundations

There are numerous others, including British Standards, Ciria Reports, Building Research Establishment Digests, Building Regulations and Fire Regulations.

3.7 Mechanical and Electrical Design: electrical aspects are more fully covered than mechanical. The principal documents are:

- BS5750 Part 1/150 9001 - Good Design Practices
- Regulations for Electrical Installations (16th Edition)
- The Electricity at Work Regulations (1989)
- BS5304 Code of Practice for Safety of Machinery
- BS4500 ISO limits and fits
- IEE Guide to Documentation for Real Time Software
- HSE Guidelines on the use of Electronics Systems in Safety Related Applications.

Operations and Maintenance.

3.8 Again, no comprehensive document exists, but the important references are:

- Manuals of the British Practice in Water Pollution Control
- Occasional Technical Paper No 4 - The Operation and Maintenance of Small Sewage Treatment Works
- BS6423 Maintenance of electrical switchgear.

3.9 Most sewerage undertakers have developed and refined their operating and maintenance procedures to reflect:

- local circumstances
- the use of telemetry
- planned maintenance
- consequences of failure
- availability of standby plant.

PRIMARY TREATMENT STANDARDS

1. The Regulations define primary treatment as "treatment of urban waste water by a physical and/or chemical process involving settlement of suspended solids, or other processes in which the BOD of the incoming water is reduced by at least 20% before discharge and the total suspended solids of the incoming water are reduced by at least 50%". Further, regulation 10 and parts I and II of Schedule 3 set out a monitoring regime for all types of treatment works.

2. Treatment plants must be well-designed, installed, and properly run, and standards must be adopted to ensure that unacceptable pollution caused by incorrect operation of the plant does not occur. The proposals set out below incorporate the Regulations' requirements into the RPA's monitoring and control regimes.

2.1 Applications for consent need to be supported by adequate information about the sewage to be treated and the treatment to be applied.

2.2 The plant must be designed to remove at least 50% of suspended solids and at least 20% of BOD as measured by 24 hour composite samples of inflow and outflow, according to Table 3 in Part II of Schedule 3 to the Regulations. These performance standards will be specified in the consent.

2.3 Sampling equipment must be installed and operated to produce 24 hour composite samples of inflow and outflow.

2.4 In order to control the discharge of excessively high levels of solids caused by the discharge of sludge or mal-operation of the plant, an absolute upper limit will apply[1], to be judged against a spot sample taken at any time.

2.5 No upper limit will be applied for BOD because this is not regarded as environmentally significant in high natural dispersion areas, and settlement processes will remove only that BOD associated with solids.

COMPREHENSIVE STUDIES TO INVESTIGATE WHETHER THERE MIGHT BE ANY ADVERSE EFFECTS ON THE ENVIRONMENT FROM ALLOWING LESS STRINGENT TREATMENT THAN SECONDARY (BUT AT LEAST PRIMARY) TREATMENT IN HIGH NATURAL DISPERSION AREAS

1. Comprehensive studies will determine whether or not a discharge into an identified high natural dispersion area will cause adverse effects if primary treatment is substituted for secondary treatment.

2. The potential pollutants of consequence are biochemical oxygen demand (BOD), suspended solids, nitrogen and phosphorus.

3. The studies will entail an initial field environmental assessment involving hydrographic surveys, chemical and biological sampling. The results of the field work will be used in predictive modelling studies to determine the probable effects of the discharge options.

4. The results of the modelling will be assessed against specified numerical criteria defining adverse effect.

5. If no adverse effects are predicted, then the River Purification Authority may give a discharge consent for primary treatment.

6. All high natural dispersion areas will be subject to regular monitoring using specified techniques. These techniques will directly measure the criteria identified as `adverse effects'.

7. The status of the water will be reviewed at intervals of not less than four years based upon the results of the monitoring.

8. The format is being developed by members of the Marine Pollution Monitoring and Management Group (see paragraph 6.8 of the guidance note).

"APPROPRIATE TREATMENT" DEFINITION

1. Regulation 5(7) requires appropriate treatment (as defined in regulation 5(8)(a)) to be applied to discharges from agglomerations of:-

> less than 2,000 pe to freshwater and estuaries;
> less than 10,000 pe to coastal waters.

Regulation 5(8)(a) defines appropriate treatment as

> "treatment of urban waste water by any process and/or disposal system which after discharge allows the receiving waters to meet the relevant quality objectives and the relevant provisions of the Directive and other Community Directives".

2. The River Purification Authorities considers appropriate treatment for discharges to freshwater (inland waters and groundwaters) to be dependent upon the size of the discharge relative to the receiving watercourse or aquifer. The treatment will typically be one of the following:- septic tank, rotating biological contactor (RBC), trickling filter, activated sludge plant, reed bed or equivalent alternative system.

3. For the discharges to estuarine and coastal waters given the dilution and dispersive characteristics of such waters, a minimum requirement will normally be screening or equivalent to retain aesthetically objectionable solids. Depending on location of the discharge, primary treatment or the treatment listed for freshwaters may be required.

FRAMEWORK FOR CONSENTING INTERMITTENT DISCHARGES

1.1 INTRODUCTION

1.1.1 Regulation 4(1) requires the sewerage undertakers to ensure that agglomerations with a population equivalent of 2000 or more are provided with collecting systems. It further requires that the collecting systems satisfy the requirements of Schedule 2. This states that the design, construction and maintenance of collecting systems shall be undertaken in accordance with the best technical knowledge not entailing excessive costs, notably regarding, among other things, the limitation of pollution of receiving waters due to storm water overflows.

1.1.2 This Annex and its detailed supporting notes at sections 2 and 3 set down in general terms, the requirements which are to be met to ensure compliance with the Regulations. In certain circumstances, for the purpose of protecting the water environment, the River Purification Authority may require more stringent standards to be met than those specified in the notes. In view of the local nature of such circumstances it is not appropriate to cover these in this paper or in the notes. Rather they are for consideration at the local level between the River Purification Authority and the sewerage undertakers.

1.1.3 In total across the UK there are about 25,000 such intermittent discharges and it is estimated that about two thirds are satisfactory. Sections 2 and 3 set out criteria for consenting those overflows that are unsatisfactory; that is, the factors to be taken into account, and the methodology and the model consent conditions to be adopted. The intention is to ensure that a common approach is used by River Purification Authorities and that dischargers, mainly sewerage undertakers, are treated in a similar manner. The requirements are set out with the objective of trying to adopt as simple an approach as possible consistent with meeting the Regulations' requirements but a more complex approach will be required where particular circumstances warrant it. It is also not intended to be totally prescriptive; there must always be the opportunity for flexibility to take account of cost and environmental benefits and to meet specific local requirements.

1.1.4 With so many discharges to consider, a fundamental question arises concerning the implementation of the guidelines. The framework proposed starts from the assumption that the River Purification Authorities will not, in the short to medium term, wish to direct resources to reviewing all intermittent discharge consents just because some of the present consents do not conform with one that would be issued according to sections 2 and 3. The River Purification Authorities and sewerage undertakers will examine priorities and timescales jointly.

1.1.5 The subsequent sections set out a framework within which effort will be focused on the discharges that are unsatisfactory and for which the sewerage undertakers need to spend money to alleviate these problems over agreed timescales. Over a longer period of time most overflows will be brought within the framework as flows increase or engineering works are required for other purposes. The trigger will be either that an overflow has become unsatisfactory (see below) or is predicted to be close to becoming so because of changes that are known to be taking place.

The use of interim measures as a staged improvement would be acceptable.

1.1.6 The Regulations require that the design, construction and maintenance of collecting systems is undertaken in accordance with best technical knowledge not entailing excessive costs, notably regarding:

volume and characteristics of urban waste water;

prevention of leaks; and

limitation of pollution of receiving waters due to storm water overflows.

Sections 2 and 3 contribute to the definition of "best technical knowledge", as mentioned in Schedule 2 of the Regulations particularly in the context of limitation of pollution.

1.1.7 All agglomerations with a population equivalent of 2000 or more should have collecting systems unless there are special circumstances. Where there are sensitive areas and a population equivalent of over 10,000, the requisite collecting systems must be in place by 31 December 1998. Requisite collecting systems must be provided for a population equivalent of over 15,000 in areas not identified as sensitive by 31 December 2000. All other implementations are required by 31 December 2005.

1.1.8 A tighter UK timescale has been established for achieving bathing water quality standards as required by the EC Bathing Water Directive. Sewerage and sewage treatment schemes are now targeted for completion in virtually all cases by 31 December 1995.

1.2 PUMPING STATION EMERGENCY OVERFLOWS RECOGNISED AS A CONSTITUENT PART OF THE COLLECTING SYSTEM

1.2.1 Sewage pumping stations are recognised as part of the collection system and normally possess emergency overflows which are designed to protect the pumping station or other property from flooding in the event of pumping station failure. The cause is usually mechanical or electrical failure and if flooding did occur the station could be sufficiently damaged to be taken out of service for days or weeks rather than a few hours. Because these overflows may operate in dry weather and often discharge to relatively small watercourses, their environmental impact can be larger than combined sewer overflows (CSOs). The emphasis in pumping station consents is to ensure that there are adequate arrangements for a quick response to minimise pollution from emergency overflows. These will depend on local circumstances. For example, the sewerage undertakers may wish to provide storage, standby equipment or access for tankers. Where the undertaker chooses to provide storage within the sewerage system or at the pumping station, for normal situations 1-2 hours storage at 3PG + I + 3E would be acceptable. For pumping stations causing or likely to cause problems, consents will be reviewed and, where necessary, enhanced levels of protection or improved back up arrangements will be specified over agreed timescales.

1.3 UNSETTLED STORM OVERFLOWS AT SEWAGE TREATMENT WORKS

1.3.1 These will be considered in the same manner as CSOs. They are usually reviewed when the consent for the treatment works is reviewed and it is not considered necessary to have a general review. Clearly, if one is unsatisfactory according to the criteria in Section 1.4.1 it should be treated as any other CSO but this may need to be tied in with a review of the consent for the whole works.

1.4 DEFINITION OF UNSATISFACTORY COMBINED SEWER OVERFLOWS

1.4.1 The following criteria are to be used in deciding which CSOs are unsatisfactory and, therefore, subject to consent review to drive improvements.

(i) causes significant visual or aesthetic impact due to solids, fungus and has a history of justified public complaint;

(ii) causes or makes a significant contribution to a deterioration in river chemical or biological class;

(iii) causes or makes a significant contribution to a failure to comply with Bathing Water Quality Standards for identified bathing waters;

(iv) operates in dry weather conditions;

(v) operates in breach of consent conditions provided that they are still appropriate; and/or

(vi) causes a breach of water quality standards (EQS) and other EC Directives.

It is also appropriate to pay due regard to the presence of designated shellfish waters in the vicinity of a CSO. However, it should be noted that, when the EC Directive on Production and Marketing of Shellfish was implemented on 1 January 1993, the faecal coliforms standard given in the Annex to the EC Directive on the Quality of Shellfish Waters reverted from an "imperative" to a "guide" value. (Further guidance will be issued in due course).

1.4.2 The criteria given in 1.4.1 are largely objective although some subjectivity may apply in the case of (i). It is not considered productive at this stage to refine these definitions further. Research is being conducted into the quantification of some of these issues. Some discretion must be left for local interpretation of the significance and contribution of an overflow to a particular problem, taking account of the costs and benefits of remedial action.

1.5 CONSENTING OF SATISFACTORY COMBINED SEWER OVERFLOWS

1.5.1 Only consents for unsatisfactory existing CSOs as defined in Section 1.4.1 need to be reviewed. Those that are satisfactory will therefore meet the requirements of the Regulations and consequently there is no need to review their consents to incorporate the requirements of the appropriate section 2 or 3. A consent may exist which is adequate or a discharge may require a consent because it is currently unconsented.

1.5.2 If a new consent is required for an existing satisfactory CSO that is not subject to change, it need only specify current conditions. These should include a statement of carry-forward flow where this information is available and should include any other facilities such as screens etc, currently installed.

1.5.3 Revised consents will clearly be required for existing satisfactory CSOs if their status changes ie, they become unsatisfactory. This is covered in Section 1.6.

1.6 CONSENTING OF UNSATISFACTORY, NEW AND ALTERED COMBINED SEWER OVERFLOWS TO RIVERS

1.6.1 Consents will be reviewed or determined as a priority in the following cases:

(i) storm overflows that are unsatisfactory according to the criteria set out in 1.4.1;

(ii) new storm overflows;

(iii) storm overflows that are identified, as a result of drainage area studies, as potentially becoming unsatisfactory in the near future; and

(iv) storm overflows that will potentially change their operating characteristics due to changes in the sewerage network (eg, consolidating CSOs).

1.6.2 If the performance is unsatisfactory due to only one of the criteria in 1.4.1 then the review should take the form of tightening only the performance of the failing criterion, subject to the proposed solution not adversely affecting other criteria. For example, if the CSO operates in dry weather conditions but does not cause any problem in respect of the other criteria, the review need only look at the carry-forward flow or the provision of storage. If the problem is only one of solids deposition, then a solids condition may be all that is required.

1.6.3 However, if the CSO is failing on two or three criteria, or is a new or radically altered discharge, then the consent review should take account of the relevant factors.

1.7 PROCEDURE FOR REVIEWING CSOs TO FRESHWATERS

1.7.1 Section 2 sets out the criteria which determine how a consent is to be reviewed for discharges to freshwaters and the model conditions that are to be incorporated. Three different approaches have been suggested in relation to the significance of the discharge. These require different levels of sophistication to determine the quality criteria (reflected in the carry forward flow). Indicative criteria for impact assessment are set out in Table 1.1. For the less significant discharges it is proposed to use minimum data methods (eg, Formula A or QUALSOC). However, there may be circumstances where, for very high dilutions, less demanding requirements than Formula A may be acceptable. For the highly significant discharges the adoption of sewer hydraulic analysis and water quality modelling with a model such as MIKE II require significant data collection and modelling facilities, but are only envisaged to be required in relatively few circumstances. In between these two extremes there is a discretionary band where sewer hydraulic models, together with simpler water quality models (eg, QUALSOC, QUALSIM, CARP), may be utilised which have less demanding data requirements.

1.7.2 When models are used to determine consent conditions, it is important to use some form of sensitivity analysis to check the impact of any assumptions made on the final outcome. The outcome must also be reviewed if the costs of potential solutions are excessive in the context of benefits gained.

1.7.3 The procedures and models referred to in the document for use with highly significant cases will be expanded on in the Urban Pollution Management Manual, which will be published by the Foundation for Water Research in 1994.

TABLE 1.1 INDICATIVE IMPACT ASSESSMENT CRITERIA FOR SETTING CONSENTS FOR CSOs TO FRESHWATERS

LOW SIGNIFICANCE
Minimum Data Methods eg, Formula A, or possibly QUALSOC Method Dilution >8:1 (foul DWF @ 5%ile low river flows) No interaction with other discharges This approach is likely to be adequate in most cases.
MEDIUM SIGNIFICANCE
Simple Models (eg, SDD Method, QUALSOC, QUALSIM, CARP + sewer hydraulic model such as WALLRUS) Dilution <8:1 No interaction or limited interaction with other discharges >2000 population equivalent Cyprinid fishery This approach is only likely to be required if all of these criteria apply.
HIGH SIGNIFICANCE
Complex Models (eg, sewer hydraulic models such as MOSQITO and river quality models such as MIKE II - to be overtaken by UPM Procedures) Dilution <2:1 Interaction with other discharges >10,000 population equivalent Cyprinid or salmonid fishery This approach is only likely to be required if all of these criteria apply.

1.8 DISCHARGES INTO COASTAL WATERS AND ESTUARIES

1.8.1 Intermittent discharges to coastal waters and estuaries impact on three different types of water: EC identified bathing waters, which have a special status, EC designated Shellfish Waters, and other waters (used for activities such as recreation, contact sports, shellfish rearing and basic amenity). The most stringent conditions apply to those identified as EC Bathing Waters.

1.8.2 Priorities for action will again be focused on the unsatisfactory discharges. In the context of coastal waters and estuaries, similar criteria can be used as for freshwaters (Section 1.4.1) except that (ii) is inappropriate. A suggested approach is summarised in Table 1.2.

1.8.3 Section 3 sets out criteria for the regulatory authority to determine consents for discharges to coastal waters based on the number of acceptable spills per bathing season to each of these waters. If it can be demonstrated that a scheme can be designed with no more than a 1.8% risk of failure of the Bathing Water Directive, specifically due to CSOs, then alternatives may be considered. These are on the assumption that the discharge is directly to the water concerned and located below MLWS (soffit level).

1.8.4 If the discharger decides to take the discharge outside of the identified bathing water or to use alternative means and can demonstrate satisfactorily that the alternatives will enable the EC Bathing Water Directive standards to be met, then this will be acceptable.

TABLE 1.2 INDICATIVE IMPACT ASSESSMENT CRITERIA FOR SETTING CONSENTS INTO COASTAL WATERS AND ESTUARIES

LOW SIGNIFICANCE
Minimum data methods (eg, Formula A) Estuarial and coastal waters not containing EC identified bathing waters and/or shellfish waters
MEDIUM SIGNIFICANCE
Simple Models (sewer hydraulic model with frequency assessment of overflow spill) Population equivalent 2,000 - 10,000 Affects identified bathing waters and/or shellfish waters This approach is only likely to be required if both criteria apply.
HIGH SIGNIFICANCE
Complex models (sewer hydraulic model with frequency assessment of overflow spill and an option for coastal dispersion model and impact assessment) Population equivalent > 10,000 Affects identified bathing waters and/or shellfish waters This approach is only likely to be required if both criteria apply.

2 CONSENTING INTERMITTENT SEWAGE DISCHARGES INTO FRESHWATERS

2.1 INTRODUCTION

2.1.1 This section sets out the basis for issuing consents for intermittent sewage discharges into freshwaters. The discharges covered include combined sewer overflows (CSOs), and storm tank discharges, at sewage treatment works and pumping stations.

2.1.2 This section supplements section 1, the "Framework for Consenting Intermittent Discharges", and should be read in conjunction with it. The section sets out the basis of policy for issuing consents for combined sewer overflows (CSOs) discharging to freshwaters. Although the standards set down in this section are considered to meet the provisions of the Regulations, it is acknowledged that there will be certain circumstances where, for the purpose of protection of the water environment, more stringent standards may be necessary. Due regard will be given to cost and environmental benefits in such cases.

2.2 DEFINITIONS

2.2.1 **DWF - Dry Weather Flow:** For design purposes calculated by the equation:

DWF = PG + I + E where:
P = Population served;
G = Water consumption per head per day;
I = Infiltration allowance; and
E = Trade Effluent flow to sewer as applicable.

2.2.2 **Formula A:** A CSO setting as defined in the Report of the Technical Committee on Storm Overflows and the Disposal of Storm Sewage (1970)(1). The Formula should be amended, as described in the Report, for any separate areas within the sewer catchment. Where storage is provided at a CSO, and in very large sewerage systems where significant smoothing of flows occurs, this will be taken into account in defining the performance equivalent to "Formula A" without storage. The standard "Formula A" is DWF + 350P + 2E, where flows are expressed in litres/day, but minor local variations have been developed and are acceptable provided they are fully documented.

2.2.3 **Scottish Development Department method (SDD Method):** An extension of the Formula A methodology using storage to limit pollution from CSOs according to the dilution capacity of the receiving stream, using the following definitions.

Available Dilution	Percentage Spill	Overflow Arrangement
8	100	Formula A
4	50	Formula A + 40 l/hd storage
2	25	Formula A + 80 l/hd storage
1	12	Formula A + 120 l/hd storage

2.2.4 **WALLRUS:** A hydraulic sewer model developed by Hydraulics Research, Wallingford.

2.2.5 **CARP:** A comparative procedure developed by WRc for assessing CSO improvements required to achieve a good quality coarse fishery in a river.

2.2.6 **QUALSOC:** A simple mass balance procedure for setting spill rates of CSOs.

2.2.7 **QUALSIM:** A statistical procedure which is a development of QUALSOC for assessing CSO improvements.

2.2.8 **MIKE II:** A suite of models developed by the Danish Hydraulics Institute with a component sponsored by the FWR Urban Pollution Management Programme. It is intended for assessing the impact of intermittent discharges using a dynamic approach.

2.3 APPLICATION OF GUIDANCE

2.3.1 This guidance applies to all new and unsatisfactory intermittent sewage discharges to any fresh waters in the UK.

2.4 NORMAL REQUIREMENTS

2.4.1 The following requirements will normally apply.

Retained Flow

2.4.2 The sewerage system must be designed so that the discharges are not made until the incoming flow exceeds that calculated from "Formula A" as defined in 2.2.2. For existing satisfactory situations less demanding requirements may be acceptable when dilution is high.

Aesthetic Control

2.4.3 The discharge should not create any visual or aesthetic impact caused by solids, paper, plastic or fungus as demonstrated by a history of justified public complaints or concern.

Water Quality Impact

2.4.4 The discharge should not cause, or significantly contribute to, a deterioration in water quality standards.

Consent Conditions

2.4.5

- Consents issued must include necessary conditions such as overflow location, type, weir setting, storage requirements etc, and aesthetic performance standards as appropriate to the receiving water uses.
- It will not be necessary to apply numeric, chemical and bacteriological quality conditions in the consent.

- The requirements may in certain circumstances be for the provision of a storm event/duration monitor, the results from which would normally be presented in the form of an annual report from the discharger.

Appraisal Techniques

2.4.6 Three different methodologies are currently available to set CSO Consent Conditions and these are defined as follows:

1. **discharge control** based upon Formula A or QUALSOC;

2. **impact assessment** using simple procedures and models eg, SDD, QUALSOC, CARP; and

3. **dynamic river quality approach** using intermittent water quality standards, with complex sewerage and environmental modelling techniques eg, WALLRUS, MIKE II. This is being developed by the UPM procedures.

The choice of which procedure should be used should be determined by the impact of the discharge.

2.5 ASSESSING THE IMPACT OF A DISCHARGE

2.5.1 The requirements for the engineering and environmental assessment needed to specify design standards will be directly related to the size and potential significance of the scheme.

In defining significance the following Table 2.1 provides guidance for selection of a particular methodology.

TABLE 2.1

INDICATIVE IMPACT ASSESSMENT CRITERIA FOR SETTING CONSENTS FOR CSOs TO FRESHWATERS

LOW SIGNIFICANCE

Discharge Control Methods eg, Formula A(1), or in some cases QUALSOC

Dilution > 8:1 (foul DWF @ 5%ile low river flows)
No interaction with other discharges

This approach is likely to be adequate in most cases.

MEDIUM SIGNIFICANCE

Impact assessment using Simple Models (eg, SDD method, QUALSOC, QUALSIM, CARP + sewer hydraulic model such as WALLRUS)

Dilution <8:1
No interaction or limited interaction with other discharges
>2000 population equivalent
Cyprinid fishery

This approach is only likely to be required if all of these criteria apply.

HIGH SIGNIFICANCE

Complex Models (eg, sewer hydraulic models such as MOSQITO and river quality models such as MIKE II - to be overtaken by UPM Procedures)

Dilution <2:1
Interaction with other discharges
>10,000 population equivalent
Cyprinid or salmonid fishery

This approach is only likely to be required if all of these criteria apply.

2.6 DISCHARGE CONTROL METHODS

2.6.1 Where the impact of discharges is of low significance, then assessment can be less sensitive and the use of Formula A as defined in 2.2.2 and its modifications are the most appropriate. Storm treatment should normally be given by provision of storm tank capacity of 68 l/hd or 2 hours storage at 3PG+I+3E or by a process giving equivalent performances. Storm tank contents should be returned to the ongoing flow for full treatment as soon as practicable after cessation of a storm.

Formula A(1)

2.6.2 This traditional approach to combined sewer overflows has been based upon hydraulic criteria to assess the size of the downstream sewer, and takes little account of the assimilative capacity of the receiving watercourse.

The Scottish Development Department Report 1977(7)

2.6.3 This provides guidelines for deciding upon the amount of storage to be incorporated within a combined sewer overflow structure. The level of storage is dependent upon the dilution factor (ie stream 95% exceedance flow/sewer DWF). This method does not predict the receiving water impact. It only attempts to reduce the impact of the discharge to a lower level, which may or may not be acceptable, depending on the river quality objectives of that river. Design guidelines are given in the SDD report for overflow settings and tank capacities where dilution in the receiving stream is limited.

QUALSOC(5, 8, 9)

2.6.4 QUALSOC uses a simple mass balance technique that enables the effects of varying the weir setting (spill rate) on the water quality downstream of the overflow to be estimated. In its current form the water quality parameter used is the 5-day BOD value and the overflow impact is assessed against the Maximum Admissible Concentration value (MAC) in the downstream river appropriate to the river classification.

2.7 THE IMPACT ASSESSMENT APPROACH

2.7.1 In the circumstances where impact assessments utilising sewer hydraulic models are required, as set out in Table 2.1. The data requirements for the building of a full dynamic sewerage and river model are considerable and in many circumstances cannot be justified for the size or impact of the scheme. A first approach is to consider the use of the following procedures.

QUALSIM

2.7.2 A statistical procedure which is a development of QUALSOC for assessing CSO improvements.

STANDARDS

2.7.3 Table 2.2 sets out standards which may be used as guidance in the QUALSOC - QUALSIM procedures for the achievement of appropriate class for supporting a viable fishery.

TABLE 2.2

Guidance standards for QUALSOC/QUALSIM models

River Class	BOD LIMIT 95%ile mg/l	99%ile mg/l	MAC mg/l
1B 2	5 9	9 16	12 20

CARP(5, 6)

2.7.4 CARP is an interim procedure for spill load estimates. This is used to calculate acceptable spill loads to individual river reaches by comparing the pattern of load input with a river reach of similar characteristics which receives significant spills but still attains its desired quality objectives.

2.8 THE DYNAMIC APPROACH USING RIVER QUALITY STANDARDS FOR INTERMITTENT DISCHARGES

2.8.1 In rivers seriously affected by intermittent polluting discharges from large urban conurbations, intermittent river quality standards are required. The aim is to provide standards which ensure the long term survival of fish and other biological life. Intermittent standards for water quality have been proposed by WRc and standards have been developed based on the following parameters:

(a) return period of an event, eg, occurs once a year;

(b) the duration of the event, eg, lasts two hours; and

(c) the magnitude of the pollution eg, river concentrations should not exceed 3 mg/l of ammonia.

By setting appropriate standards to protect aquatic life, the impact of sewerage schemes can be assessed and design conditions set for an acceptable discharge. These standards should be suitable for use in the application of the complementary dynamic river discharges model MIKE 11.

Return Period

2.8.2 The standards have been developed to achieve a satisfactory quality in the river for events with a 1 year return period. A rolling 5 year period could be the minimum practical time period over which to judge performance. Appropriate return periods for design purposes will be available through the UPM procedures in due course, or in the MIKE II Application Guide currently being issued.

Event Duration

2.8.3 The duration of an event and its effect on a river is difficult to model. For practical application it is recommended that a short term duration could be 6 hours; other duration periods may be considered.

Magnitude

2.8.4 From the chosen return period and event duration the limit for dissolved oxygen and ammonia can be determined from the research recommendations.

Standards

2.8.5 It is recommended that, as an interim measure, the receiving water quality standards to achieve and support a viable fishery with respect to intermittent discharges could be expressed as in Table 2.3. Over the next two years the Urban Pollution Management Manual will be produced which will specify the methodology, suitable models and data requirements in greater detail. These standards should be suitable for use in the application of the complementary dynamic river discharges model MIKE II.

TABLE 2.3

Recommended Criteria for 6 Hour Return Period

Duration of Event	**6 hours**
Return Period	**1 year**
Dissolved Oxygen	**≥3.5 mg/l**
Total Ammonia	**≤5.0 mg/l**

2.9 AESTHETIC CONTROL

2.9.1 The major objective in controlling CSO discharges is to minimise the presence of objectionable solids and persistent materials in watercourses. This can be achieved by a number of means, for example the design of the overflow structure or the provision of screens.

Design

2.9.2 The WRc Guide to Design of Storm Overflow Structures(10) should normally be used and, as a minimum, the installation should be of a type which gives acceptable solids separation and retention (eg a properly designed high sided weir, stilling pond or vortex separator). Such structures as leaping weirs, low sided weirs and holes in a wall are unacceptable unless no adverse impact is noted from existing structures.

Aesthetic Control

2.9.3 For NEW AND EXISTING UNSATISFACTORY CSOs there will be a standard requirement that solids separation should achieve removal of a significant quantity of solids having a size greater than 6 mm in any two dimensions. Existing unsatisfactory CSOs should be treated as new CSOs, with improvements to meet the higher standards required within a defined timescale and which may be staged.

Storm Tank Discharges

2.9.4 The normal requirement is for all sewage flows up to 3PG + I + 3E to be fully treated. Flow between 3PG + I + 3E and 6PG + I + 3E or Formula A as defined in 2.2.2 should normally have tank treatment provided by storm tank capacity of 68 l/hd or two hours at 3PG + I + 3E as appropriate or by a process giving equivalent performance. Flows greater than 6PG + I + 3E should be dealt with as CSOs.

REFERENCES

In the preparation of this section the following references have been taken into account.

1. Ministry of Housing and Local Government Technical Committee on Storm Overflows, HMSO, 1970.
2. Proposed water quality criteria for the protection of aquatic life from intermittent pollution: Dissolved Oxygen, Water Research Centre, Medmenham 1990, PRS 2498-M.
3. Proposed water quality criteria for the protection of aquatic life from intermittent pollution: Ammonia, Water Research Centre, Medmenham 1991, NR 2682.
4. NRA Policy Implementation Guidance Note SC/CC/002 - Interim guidance on issuing consents for discharge (internal).
5. Interim river quality planning procedures for controlling intermittent pollution from storage sewage overflows, Water Research Centre Report ER316E.
6. Time Series Rainfall, Water Research Centre Report ER 195E.
7. Storm Sewage Separation and Disposal; Scottish Development Department, HMSO, 1977.
8. QUALSOC, Storm Sewage Overflow Policy Group October, 1988, Welsh Water Authority.
9. QUALSOC, User Manual January, 1991, Version 5, Welsh NRA.
10. A guide to the design of storm overflow structures, Water Research Centre, Report ER304E. 1988.
11. WRC/CIRIA Tech Note 132 Phase III Stormwater Overflows and Pumping Station, 1991.

3 CONSENTING COMBINED SEWER OVERFLOWS (CSOs) INTO COASTAL WATERS AND ESTUARIES

3.1 INTRODUCTION

3.1.1 This section supplements section 1, the "Framework for Consenting Intermittent Discharges", and should be read in conjunction with it. The section sets out the basis of policy for issuing consents for combined sewer overflows (CSOs) discharging to estuarial and coastal waters. Although the standards set down in this section are considered to meet the provisions of the Regulations, it is acknowledged that there will be certain circumstances where, for the purpose of protection of the water environment, more stringent standards may be necessary and due regard will be given to cost and the environmental benefit. Control of combined sewage overflows to coastal and esturial tidal waters is needed to ensure that, where waters are identified under the provisions of the EC Bathing Water Directive, compliance with the requirements of that directive is not compromised by the adverse effect of such discharges.

3.1.2 The section recognises the need to protect other uses of coastal and esturial waters, such as recreation and amenity. With these waters there is currently no statutory requirement to be met. The RPAs however, have a duty to maintain and where necessary improve the quality of waters in the marine environment.

3.1.3 It is also recognised that there are distinct variations in the nature of receiving coastal and esturial waters of the UK. This section is therefore designed to take into account local conditions and provide a framework for issuing consents which reflect the local needs and benefits to the environment.

3.1.4 The need to limit the operation of tidal CSOs and provide emission control of sewage solids through the use of appropriate solids retention techniques is also described.

3.2 DEFINITIONS

Bathing Season

3.2.1 The period during which monitoring is carried out in accordance with EC Bathing Water Directive requirements. (For sewerage scheme design purposes this is June to September in Scotland.

Identified Bathing Waters

3.2.2 Refers to those bathing waters identified by the UK under the provisions of the EC Bathing Water Directive.

Other Waters

3.2.3 Includes those other waters used for activities such as recreation and water contact sports.

Soffit Level

3.2.4 The level of the top inner surface of the outfall pipe.

MLWS

3.2.5 The level of Mean Low Water Spring tides as given in the Admiralty Tide Tables and corrected, where necessary, for the actual location of the outfall.

On Average

3.2.6 Normally, the average over a period of not less than 10 years.

Spill Frequency

3.2.7 The number of significant spills from a CSO into the environment per bathing season or per year as appropriate. The number of spills may be based on observed spill frequency or that predicted using a verified sewer system model and long term rainfall data (See Appendix B). The size of spill which qualifies as significant will depend upon a number of factors. In general, however, for design purposes a spill greater than 50 m^3 will be significant.

Estuarial Waters

3.2.8 All waters defined as estuarial as defined under the provisions of the Regulations.

Coastal Water

3.2.9 All marine waters up to the 3 nautical mile limit, excluding estuaries.

Formula A

3.2.10 As defined in Section 2.2.2. Where there is a significant influx of holiday population then the alterative of 6 x Dry Weather Flow (defined as 6PG + I (summer) + 3E) can be used.

DWF - Dry Weather Flow

3.2.11 For design purposes calculated by the equation:

DWF = PG + I + E where:
P = Population served; and
G = Water consumption per head per day.
I = Infiltration allowance; and
E = Trade effluent flow to sewer as applicable.

3.3 APPLICATION

3.3.1 This section applies to all new or unsatisfactory combined sewage overflows discharging to any esturial and coastal waters in the U.K.

3.3.2 No specific bacteriological Environmental Quality Standards currently exist for water other than those for identified Bathing Waters. This document therefore suggests interim target performance standards for guidance. A "Guide" value for faecal coliforms is given in the Annex of the EC Shellfish Waters Directive for designated shellfish waters.

3.3.3 The procedure for consenting storm discharges to coastal waters is outlined in the flow diagram in Appendix A to this section.

3.4 MINIMUM REQUIREMENTS

3.4.1 In general, subject to specified exceptional circumstances, the following requirements will apply as a minimum.

Minimum Retained Flow

3.4.2 The sewerage system should be designed so that the CSO will not spill until the incoming flow exceeds that calculated from "Formula A" as defined in 2.2.2, and 3.2.10, or equivalent. The Formula is to be amended as described in the Report for any separate areas within the sewered catchment. Where storage is provided at a CSO and in very large sewerage systems where significant smoothing of flows occur, then this shall be taken into account in defining the performance equivalent to "Formula A" without storage.

Location

3.4.3 The outfall soffit level of all CSOs must be located below the level of low water mark of mean spring tides (MLWS) unless the following exceptional circumstances apply.

Bathing Waters

Where there are particular local extenuating circumstances which either prevent, or render it impractical to locate the outfall in accordance with the minimum requirement above, then a spill frequency standard to limit CSO operation to, on average, 1 SPILL IN EVERY 5 BATHING SEASONS should be applied and the outfall located on a case by case basis.

Other Waters

Decisions should be based on local factors, for example visibility of pipe, direct access by the public, overflow located in cliff face etc, and also the practical engineering considerations of construction and maintenance. The use of an alternative means of achieving the required standards is acceptable.

Consent Conditions

3.4.4 Consents will include such necessary conditions as overflow location, type, weir setting, storage requirements, etc to limit the operation of, and the aesthetic performance of such overflows, as appropriate to the receiving water uses. It will not be necessary to set numeric, chemical and bacteriological quality conditions in the consent, but the requirements may, in certain circumstances, be for the provision of a storm event/duration monitor, the results of which would normally be in the form of an annual report from the discharger.

3.5 USE RELATED SPILL FREQUENCY DESIGN STANDARDS

3.5.1 Where spill frequency standards are applicable under this section, sewerage undertakers should provide full technical information, including any modelling undertaken, in order to determine the expected spill frequency performance of the CSOs. The steps to be taken in applying spill frequency standards are shown diagrammatically in Appendix A.

3.5.2 Where the sewerage undertakers wish to apply standards different from those given in 3.5.3 they will need to complete validated sewer hydraulic modelling and time series rainfall response estimates for the system using historic rainfall records covering the most recent period of 10 years. Shorter periods should only be accepted where such local records are not available. Guidance on recommended methods is given in Appendix B to this section.

Identified Bathing Waters

3.5.3 The maximum number of independent storm event discharges via the combined sewer overflow(s) to identified bathing waters, or in close proximity to such waters, must not, on average, exceed the spill frequency standards of 3 SPILLS PER BATHING SEASON. This spill frequency will apply:

a) unless the CSO has not, historically, caused non-compliance of the EC Bathing Water Directive; or

b) unless the sewerage undertaker demonstrates that the scheme is designed to achieve the water quality standards of the EC Bathing Water Directive for at least 98.2% of the time.

Higher Protection (Lower Spill Frequency) Levels

3.5.4 For CSOs operating at a spill frequency of not more than 1 in 1 year a 10 mm bar screen emission performance will be acceptable.

EC Designated Shellfish Waters

3.5.5 The discharge from any new combined sewer overflows into designated Shellfish Waters should be avoided. For existing unsatisfactory overflows discharging directly to shellfish waters the ~~water~~ sew ~~company~~ undertaker should adopt a policy of improvement to minimise such spills.

Other Waters

3.5.6 There are currently no statutory provisions for these waters. As a minimum, Formula A, as specified in 2.2.2 will apply.

* If it can be demonstrated that this level of protection will produce no significant environmental benefit, then the sewered area should be treated on a case by case basis, where necessary supported by investigations and modelling exercises.

* If, because of local use requirements, a more stringent standard of protection is needed, monitoring and modelling exercises are required to assess the required discharge frequency.

3.6 IMPACT CRITERIA

3.6.1 Where the sewerage undertaker ~~water company~~ intends to extend the outfall of the CSO some distance offshore of MLWS to achieve improved dispersion of the discharge of storm sewage, the following criterion may be adopted.

- Achievement of the water quality standards of the EC Bathing Water Directive should be achieved in not less than 98.2% of the bathing season.

The impact criterion should ONLY be used in those circumstances where extensive studies, including field exercises, can be undertaken and the RPAs who have responsibility for auditing such information provided by the discharger can be reasonably satisfied with the validity of the assumptions made and the predictions produced. See Reference 2 for further advice on this approach, if applicable. Small volume discharges as defined in 3.2.7 may be exempted from impact criteria requirements.

3.7 CONTROL OF DISCHARGE OF SOLIDS

3.7.1 The control of discharge of solids is required on a year-round basis and therefore consent calculation must be based on annual data and generally based on WRc report No 9, 1991 (reference 2).

3.7.2 The steps to be taken in applying solids separation techniques to achieve aesthetic emission standard are shown diagrammatically in Appendix C to this section. A method for predicting total volumes (from annual time series rainfall) for the requirements and corresponding flow limits is summarised in Appendix D to this section.

3.7.3 The specified solids control applies to the volumes discharged after application of the appropriate engineering design to achieve the requirements of sections 3.4-3.6 as applicable to the receiving waters.

3.7.4 Any form of solids control will be considered, provided it can be demonstrated to meet the standards reasonably comparable to the polluting load removed by aperture screens, as set out below.

Identified Bathing Waters

3.7.5 For new and existing unsatisfactory CSOs, solids separation is required to achieve removal of a significant quantity of solids having a size greater than 6 mm in two dimensions.

3.7.6 It is not necessary for all the storm flow to comply with this condition as follows.

- * Where the CSO is designed to have a spill frequency of 1 in 1 Bathing Season or less, then the discharge should not contain any significant quantity of solid matter greater than 10 mm in any two dimensions. Persistent material should be removed or returned to the ongoing flow.
- * For storm flows greater than 80% of the total volume which is calculated to be spilled during a typical year, then the discharge should not contain any significant quantity of solid matter greater than that which would be retained by a 10 mm bar screen.

Other Waters

3.7.7 For new or unsatisfactory CSOs, there will be a minimum standard requirement that the discharge should not contain any significant quantity of solid matter which could be retained by a 10 mm bar screen or equivalent.

> * If it can be demonstrated that this high level of protection will produce no significant environmental benefit, then the screening requirement may be relaxed subject to the agreement of the RPA.

REFERENCES

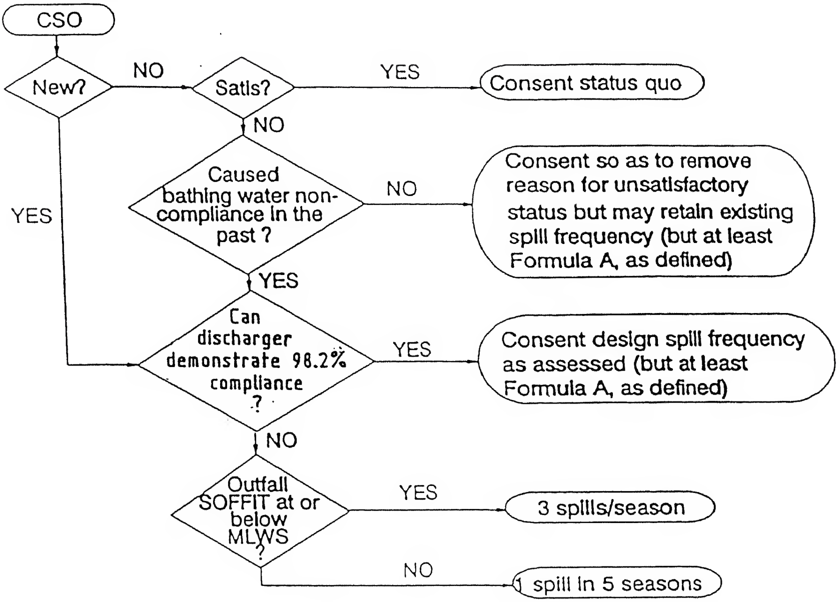
In preparation of this document the following references have been taken into account.

1. Technical Committee on Storm Overflows. HMSO 1970. Ministry of Housing and Local Government (1970)
2. Overall design approach for demonstrating compliance with Bathing Water Standards. Report No 9, WRc Report No UC693, March 1991.
3. Thomas DK, Brown S J & Harrington SW (1989). Screening at Marine Outfall Headworks. Journal of IWEM Vol 3, No 6 December 1989.
4. Draft framework for Consenting Intermittent Discharges. NRA (1992).
5. Consenting Combined Sewer Overflows to Tidal Waters. Wessex Water (1992).
6. Summary of Case Studies. Wessex Water (1992).

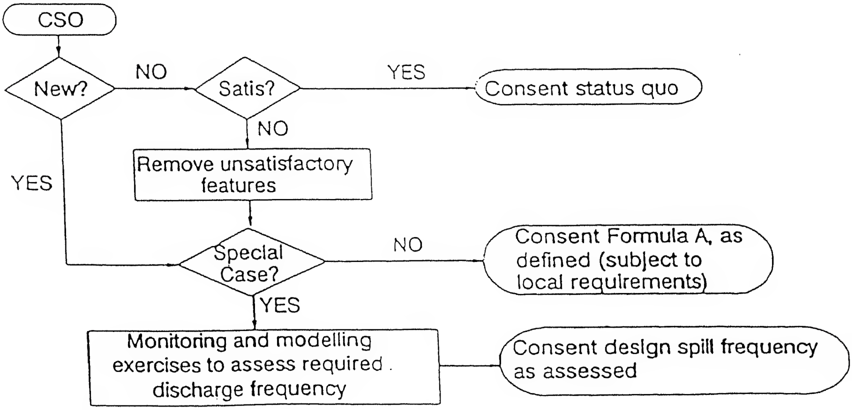
SPILL FREQUENCY STANDARDS - COASTAL WATERS & ESTUARIES

EC Identified Bathing Waters

Spill Frequency


CSO
New?
NO
Satis?
YES
Consent status quo
NO
Caused bathing water non-compliance in the past ?
NO
Consent so as to remove reason for unsatisfactory status but may retain existing spill frequency (but at least Formula A, as defined)
YES
YES
Can discharger demonstrate 98.2% compliance ?
YES
Consent design spill frequency as assessed (but at least Formula A, as defined)
NO
Outfall SOFFIT at or below MLWS ?
YES
3 spills/season
NO
1 spill in 5 seasons

Other Waters


CSO
New?
NO
Satis?
YES
Consent status quo
NO
Remove unsatisfactory features
YES
Special Case?
NO
Consent Formula A, as defined (subject to local requirements)
YES
Monitoring and modelling exercises to assess required discharge frequency
Consent design spill frequency as assessed

RESPONSE OF SEWERAGE SYSTEMS TO THE TIME SERIES RAINFALL USING SEWER HYDRAULIC MODELLING

1. In section 3 reference is made to the need for a validated sewer hydraulic modal and the analysis of time series rainfall events during the bathing season. This analysis is required to ensure confidence that an appropriate assessment of the risk has been made.

2. The Coastal Sewerage Research Group (CSRG) have investigated methods of analysing the data for time series rainfall as obtained from the Meteorological Office to produce confident predictions of spill frequencies over long time periods. These are:

Method 1	Gross characteristics of historical storms only. Urban Catchment Wetness Index (UCWI) fixed. No sequencing of events.
Method 2	Historical storms used directly with hydraulic models making maximum use of hourly information. UCWI values calculated for each storm event.
Recommended	Development of SMARTS (Stormwater Management Analysis with Rainfall Time Series) model. UCWI values calculated for each storm event. Full sequencing of events over rainfall time series.

All methods require that a prior validated sewer hydraulic model of the catchment is produced (eg WASSP/WALLRUS).

3. The recommended method allows full sequencing of events, that is the storm tank contents at the end of one storm are taken as the start condition for the next event. It is dependent on the use of the SMARTS model.

4. This method also allows investigation of pumping regimes to control discharges within a defined tidal window if this provides operational advantages. The results produced give predictions of the number of spills to be expected in a year or bathing season using the historical rainfall record. The approach is therefore particularly suitable for use with spill frequency design criteria.

5. As with all modelling procedures, care must be taken to avoid using the process to investigate criteria outside the original assumptions. The SMARTS routine takes as its base time step an hourly interval. Its use for spills of less than this duration is questionable and therefore in very small catchments an alternative methodology may be required, based on an actual time series of rainfall.

6. A report is now available on the relative accuracies of the spill reductions procedure by the three methods. Assessments have been made of the individual spill volumes, associated storage volumes and the use of a median UCWI value. The accuracy of the methods used by the discharger should be considered when determining the consent.

MINIMUM LENGTH OF RAINFALL RECORD

7. The method recommends that the minimum length of the rainfall record should be 10 years. Such long records are not available for all parts of the UK. The method also includes advice on how to deal with shorter records.

8. Whatever the length of record available an assessment of the relative wetness of the period should be made against established long rainfall records. This will ensure any undue bias to wet or dry periods is avoided in making the assessment.

REFERENCES

CSRG (1990) Estimating the frequency of operation of storm outfall and overflows - Method 1. CSRG Report No 5 WRc Report No C408 March 1990.

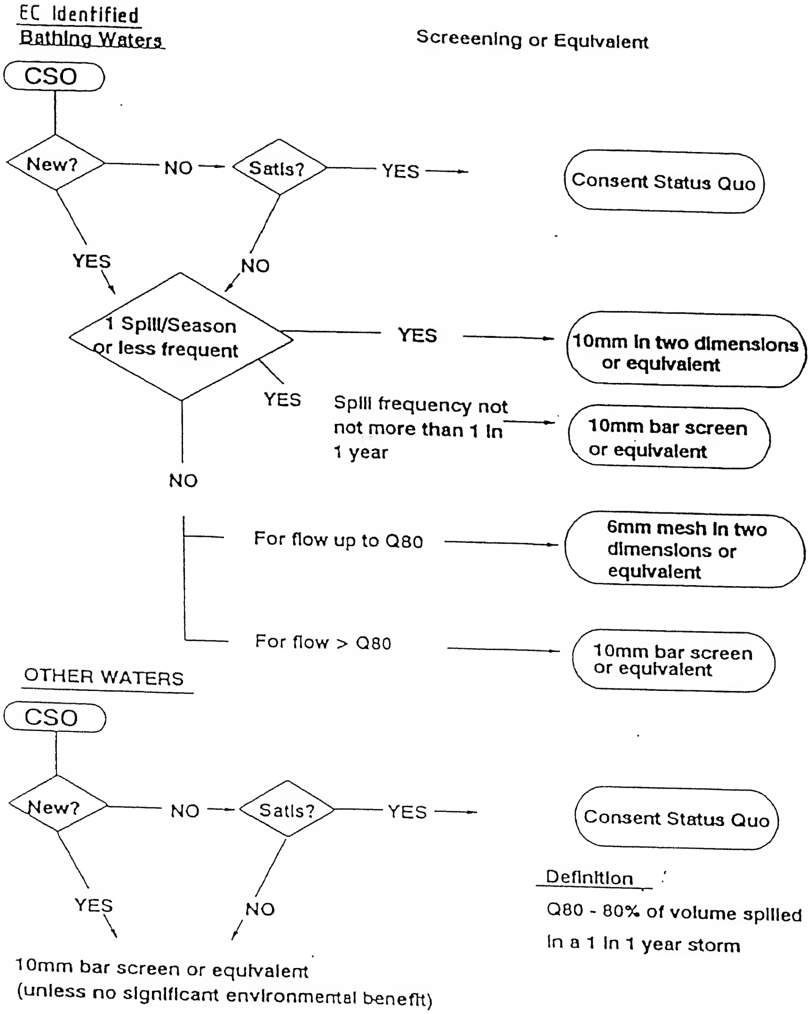
CSRG (1990) Estimating the frequency of operation of storm outfalls and overflows - Method 2. CSRG Report No 4 WRc Report No C409 March 1990.

CSRG (1991) Recommended method for estimating storm discharge volumes and frequencies. CSRG Report No 12 WRc Report No UC10106 March 1991.

CSRG (1991) An investigation of error bands associated with different spill prediction methods. CSRG Report No 14 WRc Report No UC1338 December 1991.

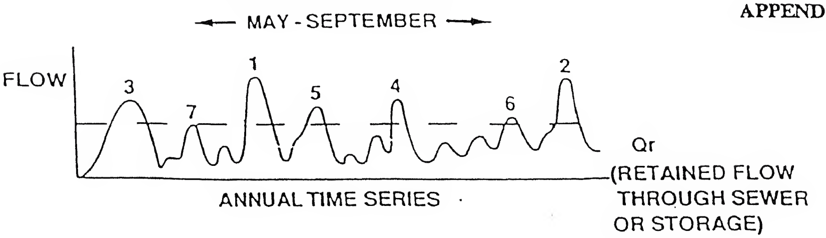
APPENDIX C

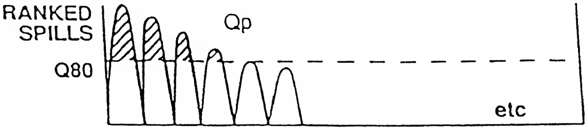
CONTROL OF DISCHARGE OF SOLIDS TO COASTAL WATERS & ESTUARIES


EC Identified
Bathing Waters
Screeening or Equivalent
CSO
New?
NO
Satis?
YES
Consent Status Quo
YES
NO
1 Spill/Season or less frequent
YES
10mm in two dimensions or equivalent
YES
Spill frequency not not more than 1 in 1 year
10mm bar screen or equivalent
NO
For flow up to Q80
6mm mesh in two dimensions or equivalent
For flow > Q80
10mm bar screen or equivalent
OTHER WATERS
CSO
New?
NO
Satis?
YES
Consent Status Quo
YES
NO
10mm bar screen or equivalent
(unless no significant environmental benefit)
Definition
Q80 - 80% of volume spilled in a 1 in 1 year storm

AESTHETIC CONTROL REQUIREMENTS FOR C.S.O's INTO COASTAL WATERS & ESTUARIES

APPENDIX D





Total volume - Area under curve

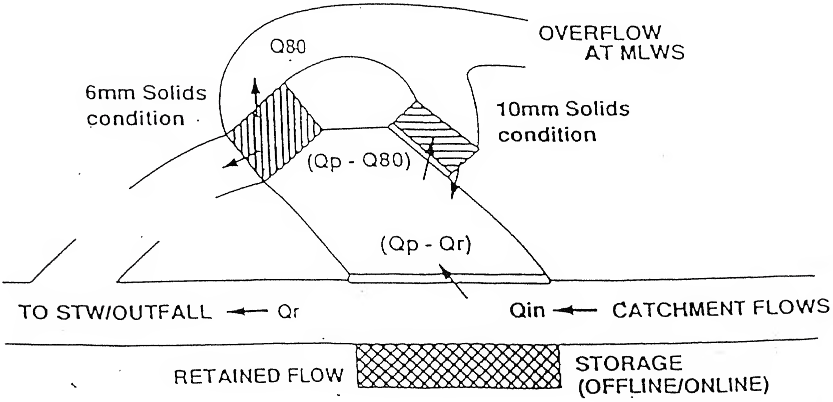
Q80 - (80% of total volume) flow

Where Qp >> Q80 then Q80 - 6mm Solids condition

(Qp - Q80) - 10mm Solids condition

Where Qp >> Q80 then 6mm for all flows

TYPICAL INSTALLATION



ABSOLUTE SPOT VALUES

1. For treatment works which discharge to normal and sensitive areas the Regulations use 95%ile composite sample values as the main monitoring control, supplemented by absolute composite sample values (under normal operating conditions). Table 1 of Schedule 3 delineates the figures against which monitoring results will be judged for compliance.

2. The Regulations also allow for tighter standards to be applied where required by receiving waters. Absolute spot sample values (under normal operating conditions) will be included in consents to protect receiving watercourses from unacceptable short period discharges and for use in legal redress when a significant polluting discharge has occurred.

3. In setting absolute spot sample standards it is appropriate to apply the following principles:

3.1 The standard applied should be no tighter than the spot value equivalent to the Regulations' absolute composite values, unless special circumstances apply.

3.2 Where special circumstances require a tighter standard it should be site specific and set at the level compatible with protecting the watercourse.

3.3 Absolute spot sample values should not normally be set at values which make them more dominant than the Regulations' values for design purposes. Where this is necessary for protection of the water course this will have be justified on an individual basis.

3.4 New consents will only have the composite COD standard set out in Table 1 of Schedule 3 of the Regulations. A spot absolute standard will not be applied.

3.5 Until the results of the national consent translation project (see paragraph 17.9 of the guidance note) become available the relationships shown in Table A overleaf should be adopted.

3.6 Longer term relationships between composite and spot values will be derived following completion of 12 months monitoring of actual performance of a wide range of sewage treatment works.

TABLE A

INTERIM RELATIONSHIPS BETWEEN SPOT AND COMPOSITE SAMPLE VALUES FOR CONVERSION OF EXISTING CONSENTS AND DESIGN PURPOSES

BOD - mg/l

95%ile		Absolute	
Composite	Spot	Composite	Spot
25	31	50	65
20	25	45	60
15	19	40	55
12	15	35	50
10	13	35	50

AMMONIA - mg/l*

95%ile		Absolute	
Composite	Spot	Composite	Spot
30	33	60	65
20	22	45	50
10	11	35	40
5	5	20	20

SUSPENDED SOLIDS - mg/l*

95%ile		Absolute	
Composite	Spot	Composite	Spot
50	70	115	160
45	63	100	140
40	56	90	125
35	49	90	125
30	42	75	105
25	35	65	90

NOTES:-

1. Intermediate consent standards to be interpolated from the above tables.

2. Consent standards more relaxed than the Directive to be determined using relationships taken from the WRc Statistical Analysis.

* Ammonia is not a parameter which needs to be consented or monitored under the terms of the Directive. As explained in paragraph 17.5 of the guidance note, the option to exclude Suspended Solids will also be exercised. The above interim relationships will therefore be used for domestic consenting purposes only. They have no formal connection with the Regulations but they are included here because of their practical relationship in matters of consenting and monitoring.

MONITORING OF DISCHARGES FROM WASTE WATER TREATMENT PLANTS

1. Regulation 10 places a duty on competent authorities or appropriate bodies to monitor or procure the monitoring of discharges from urban waste water treatment plants to verify compliance with the requirements of Part I of Schedule 3 in accordance with control procedures laid down in Part II of that Schedule.

2. Guidelines on the monitoring may be formulated in accordance with the procedures laid down in Article 18 of the Directive, ie through the Regulatory Committee.

3. This annex identifies a procedure which is considered appropriate for ~~England and Wales.~~ Scotland The recommendations are:-

3.1 Monitoring will normally be based on concentrations not minimum percentage reductions. Primary treatment will be assessed on percentage reductions.

3.2 For each works the RPA will identify the number of samples to be taken in a year on the basis of Schedule 3, Part II, paragraph 3.

3.3 Normally, samples will be 24 hour time proportional composites, made up of 24 equal aliquots taken at hourly intervals. Flow proportional composites may be necessary in a few cases, eg when pe> 150,000. The composite sample results will be taken to be the daily average concentration. Where required by the RPA the discharger will provide suitable 24 hour sampling equipment and where appropriate flow measurement equipment. Appropriate site facilities will be provided to standards approved by the RPA.

3.4 Effluent samples are taken at points agreed with the RPA.

3.5 Where works require only primary treatment, composite sampling will be carried out on influent and effluent.

3.6 Parameters measured will reflect those listed in the consents. Parameters reported will reflect those listed in Table 1 and 2 in Part I of Schedule 3. For works providing secondary and tertiary treatment BOD and COD will be reported. Suspended solids will not be reported to the EC except where the works only provides primary treatment.

3.7 The statutory register will be kept and maintained by the RPA and sample results entered therein. Samples taken when works were not performing within normal operating conditions will be identified.

3.8 The RPA will take spot samples at any time, particularly when poor performance of works is suspected. Results will be compared with absolute spot values identified in consents. This is additional to the requirements needed to achieve compliance with the Regulations.

3.11. Compliance with the Regulations will be based on meeting the requirements of Schedule 3, Part II, paragraphs 4 and 5.

3.12 Samples will continue to be taken by the RPA for the purposes of assessing compliance with other parameters included in the consents (eg List II substances) where relevant.

NORMAL OPERATING CONDITIONS, UNUSUAL SITUATIONS AND NORMAL LOCAL CLIMATIC CONDITIONS

1. The term "normal operating conditions" is used in paragraph 4(b) of Part II of Schedule 3; the phrase "unusual situations such as those due to heavy rain" is used in paragraph 5 of Part II of Schedule 3; "normal local climatic conditions" are referred to in regulation 4(3)(a).

2. In order to assist in interpreting the weather conditions that might be considered to be abnormal or unusual, a definition of exceptional weather conditions is given below, together with examples of what might be considered to be other kinds of abnormal or unusual operating conditions.

3. The abnormal conditions set out below include capital works construction and periods of industrial action. Both are being considered by the Regulatory Committee, along with other possible exceptions suggested by other Member States. An amendment to this guidance note will be issued in the light of any guidance from the Regulatory Committee.

DEFINITION

4. Sewage treatment works will be deemed to have been under normal operating conditions except during that period when:

   4.1 sections 32(4) or 32(5) of the Control of Pollution Act 1974 as amended by Schedule 23 of the Water Act 1989 applied;

   4.2 unusual weather conditions including:-

      4.2.1 low ambient temperatures as evidenced by effluent temperatures of 5 degrees centigrade or less, or by the freezing of mechanical equipment in the works;

      4.2.2 significant snow deposits;

      4.2.3 tidal or fluvial flooding;

      4.2.4 weather conditions causing unforeseen loss of power supply to the sewage treatment plant which could not be ameliorated by the reasonable provision and operation of standby generation facilities.

   4.3 the RPA has issued a variation of the consent under Part II of the Control of Pollution Act 1974 for reasons such as:

      4.3.1 capital works construction;

      4.3.2 periods of industrial action;

WORDING TO BE USED IN DISCHARGE CONSENTS FOR SEWAGE TREATMENT WORKS IN RELATION TO UNUSUAL WEATHER CONDITIONS

5. No samples of sewage effluent taken at a time when unusual weather conditions are adversely affecting the operation of the sewage

treatment works shall be taken into account in deciding whether or not the conditions contained in paragraphs X, Y and Z of this consent have been complied with.

6. For the purpose of this condition "unusual weather conditions" shall include*:-

low ambient temperatures as evidenced by effluent temperatures of 5 degrees centigrade or less, or by the freezing of mechanical equipment in the works;

significant snow deposits;

tidal or fluvial flooding;

weather conditions causing unforeseen loss of power supply to the sewage treatment plant which could not be ameliorated by the reasonable provision and operation of standby generation facilities.

7. Where the consent holder has been notified or is aware of the operation being affected by unusual weather conditions then he shall use his best endeavours to mitigate any adverse effect.

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* Definition as for 4.2 in Annex H

DISCHARGES OF INDUSTRIAL WASTE WATER TO COLLECTING SYSTEMS OR TREATMENT PLANTS

1. Regulation 7 imposes a duty on local authorities to ensure that the requirments of Schedule 4 are met in respect of trade effluent discharges to sewers. The existing discretionary power (Sewerage (Scotland) Act 1968, Part II) to consent such discharges either unconditionally or subject to such conditions as the authority may think fit is, in effect, overtaken by this duty. Local authorities will be expected to initiate changes in their current consenting regimes such that this new duty is met.

2. In general, the requirements set out in Schedule 4 of the Regulations are the objectives of current trade effluent (TE) law in the UK. However, these objectives are not set out precisely in this form in other legislation at present. The Schedule therefore specifies them for the purpose of compliance with the Directive. In many cases effluent discharged is able to comply with the relevant conditions without pre-treatment. However, in requiring the sewerage undertakers to ensure that the requirements of Schedule 4 are met, the Regulations provide for sewerage undertakers to require pre-treatment as necessary.

5. Under present practice, the requirements of Schedule 4 can be dealt with as set out below.

5.1 "Protect the health of staff working in collecting systems and treatment plants":

Certain states of flow, substances in sewage and atmospheres are already recognised as hazardous to health with action taken accordingly. Conditions can be set to ensure harmless dilution of known hazardous substances and control flows. Substances other than those declared by the trader to be present are deemed to be excluded from the effluent.

5.2 "Ensure that collecting systems, waste water treatment plants and associated equipment are not damaged":

The conditions under which such damage can occur are well defined and can be adequately addressed by Consents or other existing statutory powers.

5.3 "Ensure that the operation of waste water treatment plants and treatment of sludge are not impeded":

Again conditions under which this may occur are generally well defined, and the Consent procedure under the statutes covering trade effluent control allows adequate cover.

5.4 "Ensure that discharges from treatment plants do not adversely affect the environment, or prevent receiving waters from complying with other Community Directives":

The statutory control of discharges from treatment plants is carried out by the RPAs. Their consent procedures define treatment plant effluent content under environmental statutes and Community Directives. In turn, this defines what can be accepted into collecting systems. The relevant trade effluent statutes allow regulation, authorisation and control by sewerage undertakers.

5.5 "Ensure that sludge can be disposed of safely in an environmentally acceptable manner":

Sludge is disposed of by a variety of means, which are covered by The Scottish Office licensing and regulation or the Environmental Protection Act 1990. Similarly to 5.4 above, constraints relating to the nature and composition of industrial waste water can be imposed on dischargers by sewerage undertakers under trade effluent statutes in order to control sludge quality.

6. Current legislation enables sewerage undertakers to adopt practices which fit well with the philosophy of regulation 7 and the objectives of Schedule 4.

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6. Current legislation enables sewerage undertakers to adopt practices which fit well with the philosophy of regulation 7 and the objectives of Schedule 4.